

Digital Video Camera Recorder ^{Mini DV} Digital Video Cassette

Operating Instructions

Before operating the unit, please read this manual thoroughly, and retain it for future reference.

Owner's Record

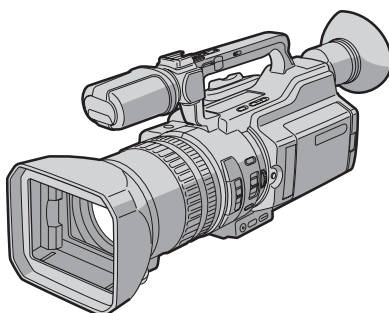
The model and serial numbers are located on the bottom. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. **DCR-VX2100**

Model No. **AC-**_____

Serial No. _____

Serial No. _____



HANDYCAM



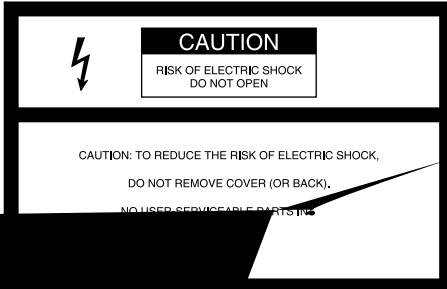
DCR-VX2100

Welcome!

Congratulations on your purchase of this Sony Digital Handycam camcorder. With your Digital Handycam, you can capture life's precious moments with superior picture and sound quality. Your Digital Handycam is loaded with advanced features, but at the same time it is very easy to use. You will soon be producing home video that you can enjoy for years to come.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK),
NO USER-SERVICEABLE PARTS INSIDE.

This symbol is intended to alert the user to the presence of "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

If static electricity or electromagnetism causes the unit to stop operating, disconnect the power to the unit by unplugging the power cord from the i.LINK cable again.

For customers in the U.S.A. and Canada

CAUTION

TO PREVENT ELECTRIC SHOCK, MATCH WIDE END OF PLUG TO WIDE SLOT, FULLY INSERT.

For the customers in the U.S.A.

If you have any questions about this product, you may call:

Sony Customer Information Center 1-800-222-SONY (7669)

The number below is for the FCC related matters only.

Regulatory Information

Declaration of Conformity

Trade Name: SONY
Model No.: DCR-VX2100
Responsible Party: Sony Electronics Inc.
Address: 680 Kinderkamack Road, Oradell, NJ07649 U.S.A.

Telephone No.: 201-930-6972

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The supplied interface cable must be used with the equipment in order to comply with the limits for a digital device pursuant to subpart B of Part 15 of FCC Rules.

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“Memory Stick” Operations

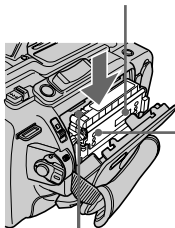
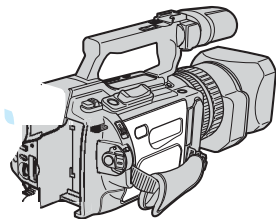
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Quick Reference

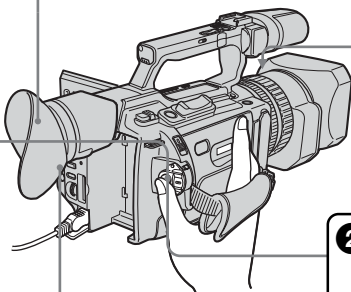
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3 Recording a picture (p. 16)

Viewfinder

When the LCD panel is closed, use the viewfinder placing your eye against its eyecup.



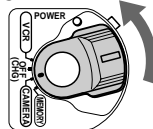
- 4** Press START/STOP. Your camcorder starts recording. To stop recording, press START/STOP again.



- 3** Slide OPEN back in the ► mark direction to open the LCD panel.

- 1** Open the shutter of the hood with a lens cap. For more information about attaching the hood with a lens cap, see page 167.

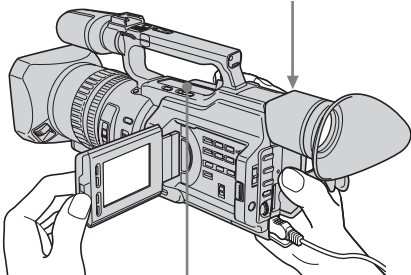
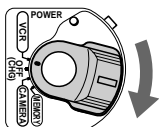
- 2** Set the POWER switch to CAMERA while pressing the small green button.



If the ND1 or ND2 indicator flashes, see page 47.

4 Monitoring the playback picture on the LCD screen (p. 27)

- 1** Set the POWER switch to VCR while pressing the small green button.

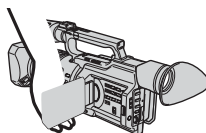


- 2** Press ◀◀ to rewind the tape.
3 Press ▶▶ to start playback.



NOTE

Do not pick up your camcorder by holding the viewfinder, the LCD panel, the battery pack, or the microphone.



Using this manual

As you read through this manual, buttons and settings on your camcorder are shown in capital letters.

e.g. Set the POWER switch to CAMERA.

When you carry out an operation, you can hear a beep or a melody sound to indicate that the operation is being carried out.

Note on cassette memory

Your camcorder is based on the DV format. You can only use mini DV cassettes with your camcorder. We recommend that you use a tape with cassette memory **CM**.

The functions which require different operations depending on whether or not the tape has cassette memory are:

- Searching the end point of the recording – end search (p. 26,30)
- Searching a recording by index – index search (p. 65)
- Searching a recording by date – date search (p. 68)
- Searching for a photo – photo search (p. 70).

The functions you can operate only with cassette memory are:

- Searching the boundaries of recorded tape by title – title search (p. 67)
- Superimposing a title (p. 99)
- Making your own titles (p. 103)
- Labeling a cassette (p. 105).

For details, see page 144.



You see this mark in the introduction of the features that are operated only with cassette memory.

Tapes with cassette memory are marked with **CM** (Cassette Memory).

Using this

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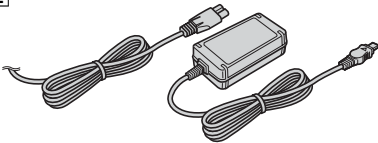
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Contents of
malfunction

Checking supplied accessories

Make sure that the following accessories are supplied with your camcorder.

<div>1</div> 	<div>2</div> 	<div>3</div>
<div>4</div>	<div>5</div>	<div>7</div>
<div>8</div>		

1 Wireless Remote Commander (1)
(p. 170)

2 AC-L15A/L15B AC Adaptor (1), Power
cord (1) (p. 10)

3 NP-F330 rechargeable battery pack (1)
(p. 9, 10)

4 Size AA (R6) battery for Remote
Commander (2) (p. 171)

5 "Memory Stick" (1) (p. 116)

6 A/V connecting cable (1) (p. 31, 74)

7 Shoulder strap (1) (p. 168)

8 Hood with a lens cap (1) (p. 167)

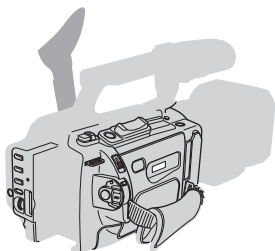
Step 1 Preparing the power supply

Installing the battery pack

Install the battery pack to use your camcorder outdoors.

- (1) Lift up the viewfinder.
- (2) Insert the battery pack in the direction of the ▼ mark on the battery pack. Slide the battery pack until it clicks.

1



2

To remove the battery pack

Lift up the viewfinder.

Slide the battery pack out in the direction of the arrow while pressing BATT RELEASE down.

Step 1 Preparing the power supply

Until your camcorder calculates the actual remaining battery time
“- - - min” appears in the display window.

While charging the battery pack, no indicator appears or the indicator flashes in the display window in the following cases:

- The battery pack is not installed correctly.
- The AC Adaptor is disconnected.
- Something is wrong with the battery pack.

When using the AC Adaptor

Be sure to use it near the wall outlet. If a malfunction occurs, disconnect the plug from the wall outlet.

Charging time

Battery pack	Full charge (Normal charge)
NP-F330 (supplied)	150 (90)
NP-F550	210 (150)
NP-F730/F750	300 (240)
NP-F960	420 (360)

Approximate minutes to charge an empty battery pack

Recording time

Battery pack	Recording with the viewfinder		Recording with the LCD screen	
	Continuous	Typical*	Continuous	Typical*
NP-F330 (supplied)	75 (65)	40 (35)	60 (55)	30 (30)
NP-F550	150 (135)	80 (75)	130 (115)	70 (60)
NP-F730	265 (240)	145 (130)	230 (205)	125 (110)
NP-F750	315 (275)	175 (150)	265 (235)	145 (130)
NP-F960	575 (515)	320 (285)	480 (430)	265 (240)

Approximate minutes of recording time when you use a fully charged battery

Numbers in parentheses “()” indicate the time using a normally charged battery. You cannot use the NP-500/510/710 battery pack on your camcorder.

* Approximate minutes when recording while you repeat recording start/stop, zooming and turning the power on/off. The actual battery life may be shorter.

Step 1 Preparing the power supply

Playing time

Battery pack	Playing time on LCD screen	Playing time with LCD closed
NP-F330 (supplied)	90 (80)	110 (95)
NP-F550	185 (165)	225 (195)
NP-F730	305 (275)	385 (345)
NP-F750	375 (335)	460 (415)
NP-F960	680 (610)	830 (745)


Approximate minutes of playing time when you use a fully charged battery

Numbers in parentheses “()” indicate the time using a normally charged battery. You cannot use the NP-500/510/710 battery pack on your camcorder.

Notes

- The supplied battery pack is charged a little.
- Some types of the battery packs may not be sold in your region or country.
- Approximate recording time and continuous playing time at 25°C (77°F). The battery life will be shorter if you use your camcorder in a cold environment.

What is “InfoLITHIUM?”

The “InfoLITHIUM” is a lithium ion battery pack which can exchange data such as battery consumption with compatible video equipment. This unit is compatible with the “InfoLITHIUM” battery pack (L series). Your camcorder operates only with the “InfoLITHIUM” battery. “InfoLITHIUM” battery packs (L series) have the  mark.

“InfoLITHIUM” is a trademark of Sony Corporation.

If the camcorder is immediately turned off

Even if the remaining battery time is enough to operate, charge the battery pack fully again. The correct remaining time is displayed.

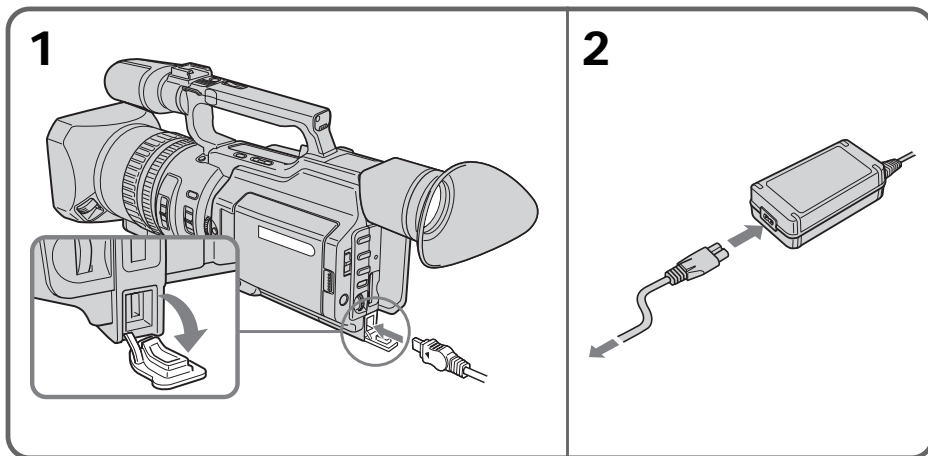
Step 1 Preparing the power supply

Connecting to a wall outlet

When you use your camcorder for a long time, we recommend that you power it from a wall outlet using the AC Adaptor.

- (1) Open the DC IN jack cover and connect the AC Adaptor to the DC IN jack on your camcorder with the plug's ▲ mark facing toward the LCD panel side.
- (2) Connect the power cord to the AC Adaptor.
- (3) Connect the power cord to a wall outlet.

Getting Started



Precaution

The set is not disconnected from the AC power source (house current) as long as it is connected to the wall outlet, even if the set itself has been turned off.

Notes

- The power cord must only be changed at an authorized service shop.
- AC Adaptor can supply power even if the battery pack is attached to your camcorder.
- The DC IN jack has source priority. This means that the battery pack cannot supply any power if the power cord is connected to the DC IN jack, even when the power cord is not plugged into a wall outlet.

Using a car battery


Use the Sony DC Adaptor/Charger (optional).

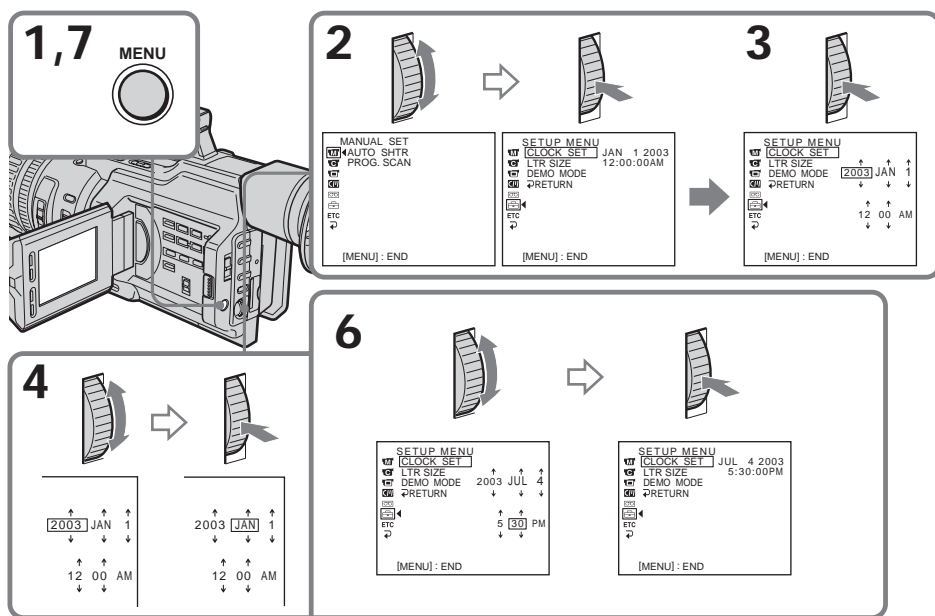
Step 2 Setting the date and time

Set the date and time when you use your camcorder for the first time. "CLOCK SET" will be displayed each time that you set the POWER switch to CAMERA or MEMORY unless you set the date and time settings.

If you do not use your camcorder for **about four months**, the date and time may be cleared from memory (bars may appear) because the built-in rechargeable battery installed in your camcorder will have been discharged (p.160).

First, set the year, then the month, the day, the hour and then the minute.

- (1) Press MENU to display the menu in the standby mode.
- (2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select CLOCK SET, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to adjust to the desired year, then press the dial.
- (5) Set the month, day and hour by turning the SEL/PUSH EXEC dial and pressing the dial.
- (6) Set the minute by turning the SEL/PUSH EXEC dial and pressing the dial by the time signal. The clock starts to move.
- (7) Press MENU to erase the menu display.



The year changes as follows:

1995 ↔ 1996 ← ... → 2003 ← ... → 2079

If you do not set the date and time

“--:--:--” (time) and “--- ---” (date) are recorded on the data code of the tape and the “Memory Stick.”

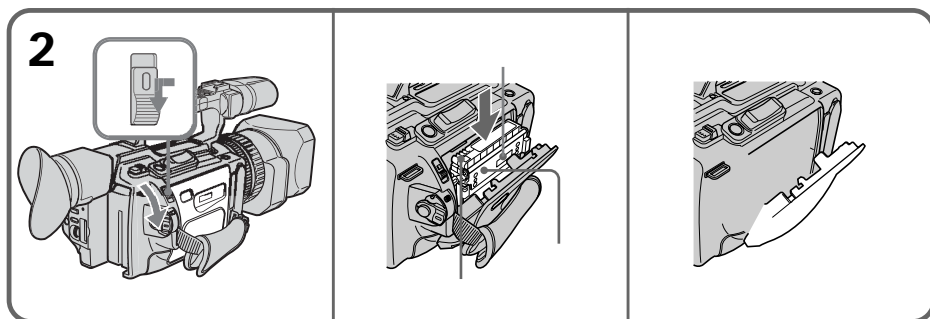
Note on the time indicator

The internal clock of your camcorder operates on a 12-hour cycle.

- 12:00 AM stands for midnight.
- 12:00 PM stands for noon.

Step 3 Inserting a cassette

- (1) Install the power source.
- (2) While pressing the small blue button on the EJECT switch, slide it in the direction of the arrow. After the cassette lid is opened, the cassette compartment automatically opens.
- (3) Push the middle portion of the back of the cassette to insert it. Insert the cassette in a straight line deeply into the cassette compartment with the window facing out and the write-protect tab facing upward.
- (4) Close the cassette compartment by pressing the PUSH mark on it.
- (5) Close the cassette lid until it clicks by pressing the PUSH button on the lid.



To eject a cassette

Follow the procedure above, and take out the cassette in step 3.

Note

The cassette lid will not be closed when you press any part of the lid other than the PUSH button.

When you use mini DV cassettes with cassette memory

Read the instruction about cassette memory to use this function properly (p. 144).

To prevent accidental erasure

Slide the write-protect tab on the cassette to SAVE.

If the grip strap prevents the cassette lid from opening fully

Adjust the length of the grip strap (p. 168).

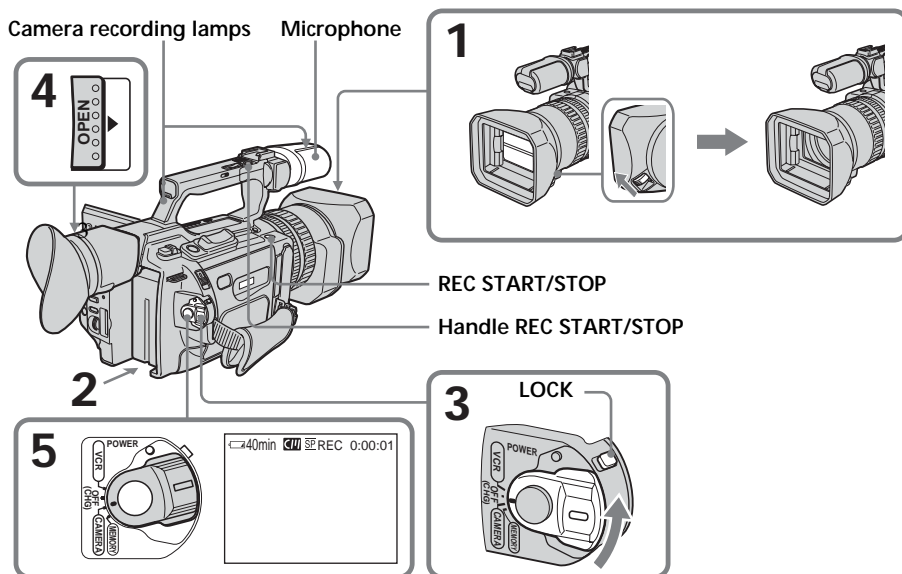
If flashes even if the cassette has been inserted

Press the PUSH button again to close the cover firmly.

Recording a picture

Your camcorder automatically focuses for you.

- (1) Open the shutter of the hood with a lens cap. For more information about attaching the hood with a lens cap, see page 167.
- (2) Install the power source and insert a cassette. See “Step 1” to “Step 3” (p. 9 to 15) for more information.
- (3) Set the POWER switch to CAMERA while pressing the small green button. Your camcorder is set to the standby mode.
- (4) Slide OPEN in the direction of the ► mark to open the LCD panel. The picture now being shot is displayed on the LCD screen, and it disappears from the viewfinder screen.
- (5) Press START/STOP. Your camcorder starts recording. The “REC” indicator appears. The camera recording lamps located on the front and rear of your camcorder light up. To stop recording, press START/STOP again. You can use REC START/STOP located on the handle or front instead of START/STOP on the rear.



If the ND1 or ND2 indicator flashes on the LCD screen or in the viewfinder

The ND filter is necessary. Set the ND FILTER selector to 1 or 2. However, if you change the position during recording, the brightness of the picture may change or audio noise may occur. This is not a malfunction. We recommend that you check the position of the ND FILTER selector before shooting. See “Using the ND filter” on page 47.

Notes

- Fasten the grip strap firmly.
- Do not touch the microphone during recording.

Recording a picture

Note on the recording mode

Your camcorder records and plays back in SP (standard play) mode and in LP (long play) mode. Select SP or LP in the menu settings. In LP mode, you can record 1.5 times as long as in SP mode.

When you record a tape on your camcorder in LP mode, we recommend playing the tape on your camcorder.

Note on the LOCK switch

When you slide the LOCK switch to the left, the POWER switch can no longer be set to MEMORY accidentally. The LOCK switch is set to the right as a default setting. We recommend that you set the LOCK switch to the left when you record on a cassette.

Note on the progressive recording mode

If you intend to use the images on your PC or play the images back as still images, we recommend that you set PROG. SCAN to ON in the menu settings before shooting (p. 34). The picture quality may improve in this mode, but if you shoot a moving subject, the image may shake when it is played back.

To enable smooth transition

Transition between the last scene you recorded and the next scene is smooth as long as you do not eject the cassette even if you turn off your camcorder. When you use a tape with cassette memory, however, you can make the transition smooth even after ejecting the cassette if you use the end search function (p. 26).

However, check the following:

- When you change the battery pack, set the POWER switch to OFF (CHG).
- Do not mix recordings in the SP mode and ones in the LP mode on one tape.

Note on tape transition

The playback picture may be distorted or the time code may not be written properly between scenes when:

- You change the recording mode (SP/LP).
- You record in LP mode.

If you leave your camcorder in standby mode for five minutes while the cassette is inserted

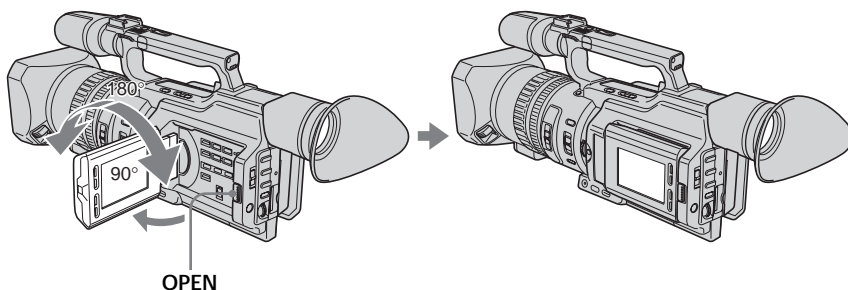
Your camcorder automatically turns off. This is to prevent tape wear and save battery power. To resume the standby mode, set the POWER switch to OFF (CHG), and to CAMERA again. When a cassette is not inserted, your camcorder does not turn off.

Recording a picture

Adjusting the LCD screen

The LCD panel is opened up to 90 degrees and it rotates about 90 degrees to the viewfinder side and about 180 degrees to the lens side.

If you turn the LCD panel over so that it faces the other way in standby or recording mode, the ☺ indicator appears on the LCD screen and in the viewfinder (**Mirror mode**).



To close the LCD panel, set it vertically and swing it into the camcorder body until it clicks.

Note

When you open the LCD panel, the viewfinder is automatically turned off, however, it is not turned off when the LCD panel is turned over or the camcorder is in mirror mode.

When you adjust the angle of the LCD panel

Make sure that the LCD panel is opened up to 90 degrees.

When using both the LCD screen and the viewfinder during shooting

The usable time of the battery pack when using both the LCD screen and the viewfinder will be shorter a little than when using the viewfinder only.

Pictures in the mirror mode

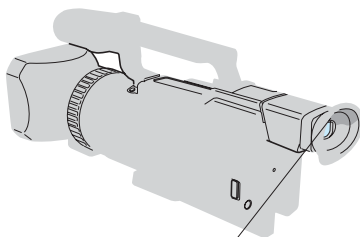
The picture on the LCD screen is a mirror-image. However, the recording picture will be normal.

During recording in mirror mode

ZERO SET MEMORY on the Remote Commander does not work.

Indicators in the mirror mode

The STBY indicator appears as ●■ and REC as ●. Some of the other indicators appear mirror-reversed and others are not displayed. However, if you close the LCD panel with the LCD screen turned over, indicators appear normally.

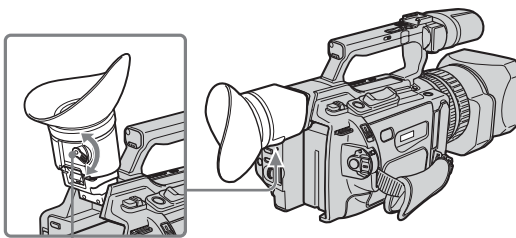


Recording a picture

Adjusting the viewfinder

If you record pictures with the LCD panel closed, check the picture with the viewfinder. Adjust the viewfinder lens to your eyesight so that the images in the viewfinder come into sharp focus.

Lift up the viewfinder and move the viewfinder adjustment lever.



Viewfinder adjustment lever

To adjust the brightness of the viewfinder screen, use the VF B.L. item in the menu settings (p. 109).

Even if you adjust the viewfinder screen backlight

The recorded picture will not be affected.

The eyecup

You can attach the eyecup with the large part of it located on both left and right. See page 167 for details.

Using the zoom feature

To zoom using the zoom lever/handle zoom lever

Press the power zoom lever a little for a slower zoom. Press it deeper for a faster zoom. Using the zoom function sparingly results in better-looking recordings.

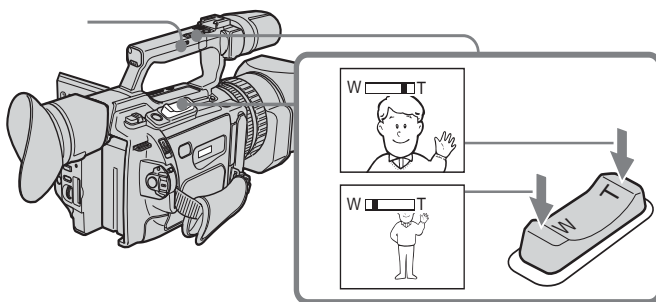
“T” side: for telephoto (subject appears closer)

“W” side: for wide-angle (subject appears farther away)

When using the handle zoom lever, you can change the zooming speed using the handle zoom switch.

H: Fast

L : Slow



Notes

- When the handle zoom switch is set to OFF, you cannot operate the handle zoom lever.
- The handle zoom switch does not interlock with the zoom lever of the camcorder.

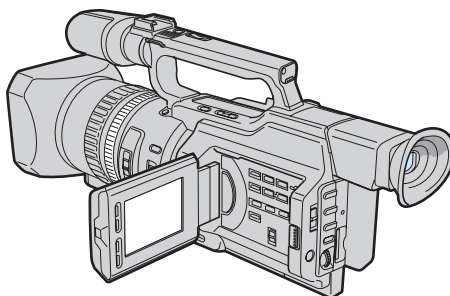
When you shoot close to a subject

If you cannot get a sharp focus, press the “W” side of the power zoom lever until the focus is sharp. You can shoot a subject that is at least about 80 cm (about 2 feet 5/8 inch) away from the lens surface in the telephoto position, or about 1 cm (about 1/2 inch) away in the wide-angle position.

To zoom using the zoom ring

Using the zoom ring, you can control the zoom by your desired speed and you can make fine adjustments.

During recording, turn the zoom ring to the desired speed.



Note

If you turn the zoom ring quickly, the zoom may not respond to the zoom ring. Rotate the zoom ring with appropriate speed.

Recording a picture

Using the digital zoom – Zoom greater than 12×

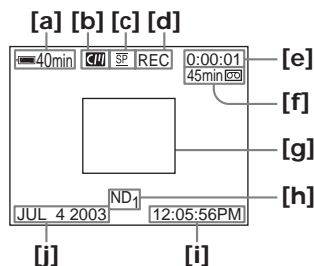
Zoom greater than 12× is performed digitally, if you set D ZOOM to 24× or 48× in the menu settings. The digital zoom function is set to OFF as a default setting (p. 109). If you use the digital zoom function, the picture quality deteriorates.

You cannot use the digital zoom:

- When you set PROG. SCAN to ON in the menu settings (p. 109).
- When the POWER switch is set to MEMORY.

Indicators displayed during recording

The indicators are not recorded on the tapes.



[a] Remaining battery time

This appears after you turn on the power and wait for a while.

[b] Cassette memory

This appears when using a tape with cassette memory.

[c] Recording mode

[d] STBY/REC

[e] Time code/Tape counter

[f] Remaining tape

This appears after you insert a cassette.

[g] Guide frame

[h] ND filter

This flashes when the ND FILTER selector should be set. After you have set the ND FILTER selector, the ND FILTER position selected is indicated. (When the ND OFF position is selected, the indication disappears.)

[i] Time

The time is displayed about five seconds after the POWER switch is set to CAMERA or MEMORY.

[j] Date

The date is displayed about five seconds after the POWER switch is set to CAMERA or MEMORY.

Recording a picture

Time code

The time code indicates the recording or playback time, “0:00:00” (hours : minutes : seconds) in CAMERA mode and “0:00:00:00” (hours : minutes : seconds : frames) in VCR mode. You cannot rewrite only the time code. Your camcorder uses the drop frame mode.

Remaining tape indicator

The indicator may not be displayed accurately depending on the tape.


Note on recording date/time

Recording date/time is not displayed during shooting, however, it is automatically recorded on the tape. You can check the recording date/time during playback by pressing DATA CODE.

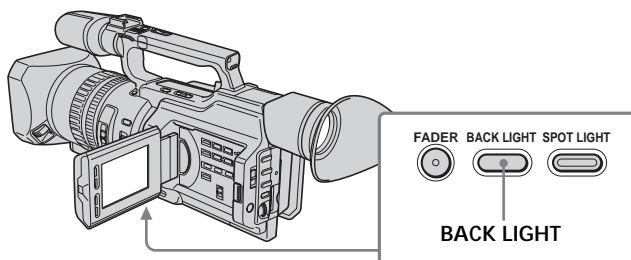
Shooting backlit subjects (BACK LIGHT)

When you shoot a subject with the light source behind the subject or a subject with a light background, use the backlight function.

Press BACK LIGHT in standby, recording, or memory mode.

The  indicator appears on the LCD screen or in the viewfinder.

To cancel, press BACK LIGHT again.



If you press one of the following buttons when using the backlight function

The backlight function will be canceled.

- SPOT LIGHT
- EXPOSURE

When you manually adjust the exposure


You cannot use the backlight function.

Recording a picture

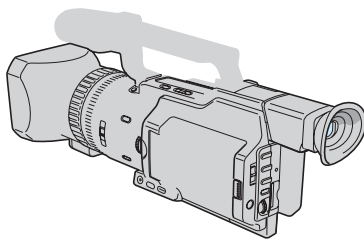
Using the spot light function

This function prevents people's faces, for example, from appearing excessively white when shooting subjects lit by strong light, such as in the theater.

Press SPOT LIGHT in standby, recording, or memory mode.

The  indicator appears on the LCD screen or in the viewfinder.

To cancel, press SPOT LIGHT again.



If you press one of the following buttons when using the spot light function

The spot light function will be canceled.

- BACK LIGHT
- EXPOSURE

When you manually adjust the exposure

You cannot use the spot light function.



You cannot use the spot light mode while in the following settings:

- Shutter speed value of 1/30 or smaller
- Old movie
- Low lux mode of the PROGRAM AE function

Recording a picture

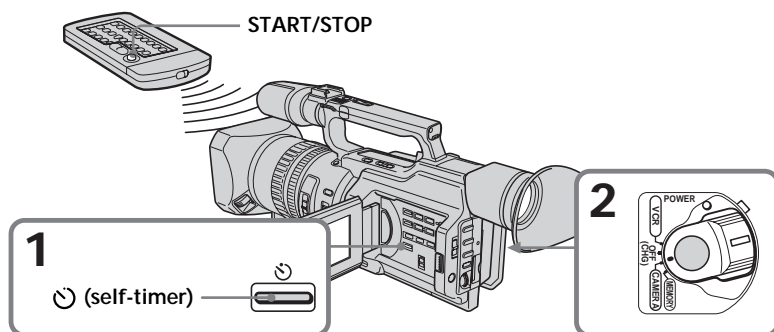
Self-timer recording

You can make a recording with the self-timer. This recording is useful when you want to record yourself. You can also use the Remote Commander.

(1) Press  (self-timer) in standby mode. The  (self-timer) indicator appears on the LCD screen or in the viewfinder.

(2) Press START/STOP.

Self-timer starts counting down from 10 seconds with a beep sound. In the last two seconds of the countdown, the beep sound gets faster, then recording starts automatically.



To stop the self-timer before recording

Press START/STOP again.

Use the Remote Commander for convenience.



To record still pictures on tapes using the self-timer

Press PHOTO in step 2 (p. 33).

To record still pictures on a "Memory Stick" using the self-timer

Press , then press PHOTO in memory mode (p. 124).

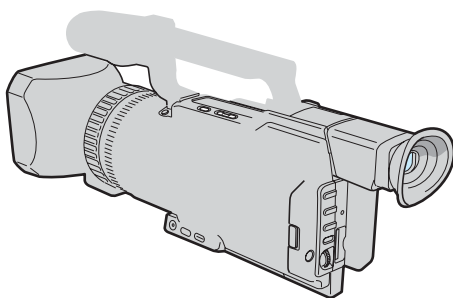
To cancel self-timer recording

Press  (self-timer) so that the  indicator disappears from the LCD or viewfinder screen while your camcorder is in standby mode.

Note

The self-timer recording is automatically canceled when:

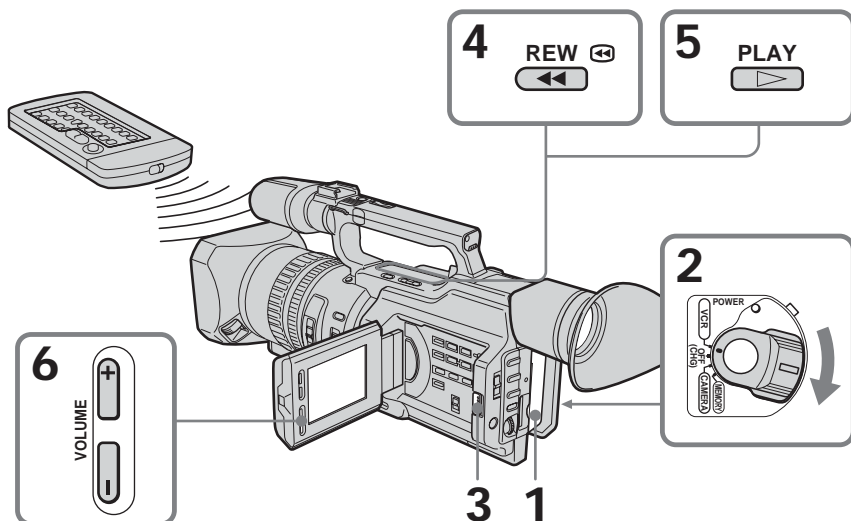
- Self-timer recording is finished.
- The POWER switch is set to OFF (CHG) or VCR.



Playing back a tape

You can monitor the playback picture on the LCD screen. If you close the LCD panel, you can monitor the playback picture in the viewfinder. You can also control playback using the Remote Commander supplied with your camcorder.

- (1) Install the power source and insert the recorded tape.
- (2) Set the POWER switch to VCR while pressing the small green button. The video control buttons light up.
- (3) Slide OPEN in the direction of the ► mark to open the LCD panel.
- (4) Press ◀◀ to rewind the tape.
- (5) Press ► to start playback.
- (6) To adjust the volume, press either of the VOLUME +/- buttons .



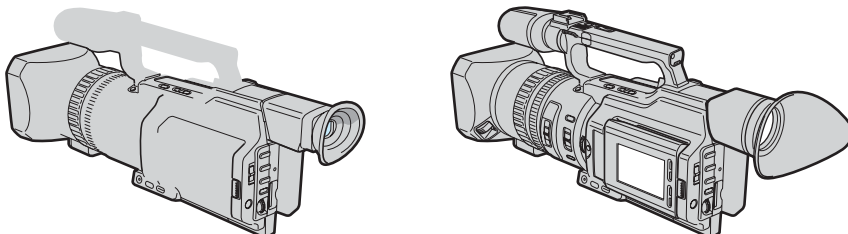
To stop playback

Press ■.

Playing back a tape

When monitoring on the LCD screen

You can turn the LCD panel over and move it back to the camcorder body with the LCD screen facing out.



When you close the LCD panel

You cannot monitor the sound from the speaker. However, when the LCD panel is turned over to view on the LCD screen, you can monitor the sound from the speaker.

To control the display of the screen indicators

Press DISPLAY on the camcorder or on the Remote Commander supplied with your camcorder.

The indicators appear on the LCD screen.

To make the indicators disappear, press DISPLAY again.

Using the data code function

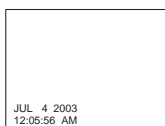
Your camcorder automatically records not only images on the tape but also the recording data (date/time or various settings when recorded) (**Data code**).

Press DATA CODE on the camcorder or on the Remote Commander supplied with your camcorder in playback mode.

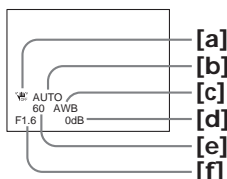
The display changes as follows:

date/time → various settings (SteadyShot, white balance, gain, shutter speed, aperture value, exposure mode) → no indicator

Date/time



Various settings



- [a] SteadyShot OFF
- [b] Exposure mode/PROGRAM AE mode
- [c] White balance
- [d] Gain
- [e] Shutter speed
- [f] Aperture value

To not display the various settings

Set DATA CODE to DATE in the menu settings (p. 109).

The display changes as follows:

date/time ↔ no indicator

Recording data

Recording data is your camcorder's information when you have recorded something. In CAMERA mode, the recording data will not be displayed.

When you use the data code function, "--- -- ----" (date) or "-- : -- : --" (time) appears if:

- A blank portion of the tape is being played back.
- The tape is unreadable due to tape damage or noise.
- The tape was recorded by the camcorder without the date and time set.

Data code

When you connect your camcorder to the TV, the data code also appears on the TV screen (p. 31).

Note on the date/time indicator

Recording date/time is not displayed during shooting, however, it is automatically recorded on the tape. You can check the recording date/time during playback by pressing DATA CODE.

If the exposure adjustment is set to minimum

"CLOSE" is displayed at the location of the aperture value.

Playing back a tape

Various playback modes

To operate video control buttons, set the POWER switch to VCR.

To view a still picture (playback pause)

Press **II** during playback. To resume normal playback, press **▶** or **II**.

To advance the tape

Press **▶▶** in stop mode. To resume normal playback, press **▶**.

To rewind the tape

Press **◀◀** in stop mode. To resume normal playback, press **▶**.

To change the playback direction

Press **<** on the Remote Commander during playback to reverse the playback direction. To resume normal playback, press **▶**.

To locate a scene monitoring the picture (picture search)

Keep pressing **◀◀** or **▶▶** during playback. To resume normal playback, release the button.

To monitor the picture at high-speed while advancing or rewinding the tape (skip scan)

Keep pressing **◀◀** while rewinding or **▶▶** while advancing the tape. To resume rewinding or advancing, release the button.

To view the picture at slow speed (slow playback)

Press **▶** during playback. For slow playback in the reverse direction, press **<** on the Remote Commander, then press **▶**. To resume normal playback, press **▶**.

To view the picture at double speed

Press **×2** on the Remote Commander during playback. For double speed playback in the reverse direction, press **<**, then press **×2** on the Remote Commander. To resume normal playback, press **▶**.

To view the picture frame-by-frame

Press **II▶** on the Remote Commander in playback pause mode. For frame-by-frame playback in the reverse direction, press **◀II**. To resume normal playback, press **▶**.

To search the last scene recorded (END SEARCH)

Press **END SEARCH** in stop mode. The last five seconds of the recorded portion plays back and stops.

In various playback modes

- Sound is muted.
- The previous picture may remain as a mosaic image during playback.

When the playback pause mode lasts for five minutes

Your camcorder automatically enters the stop mode. To resume playback, press **▶**.

Slow playback

Slow playback can be performed smoothly on your camcorder, however, this function does not work for a signal output through the **■** DV Interface.

When you play back a tape in reverse

Horizontal noise may appear at the center, or the top and bottom of the screen. This is not a malfunction.

If you insert the cassette recorded in a PAL system

The camcorder automatically identify the system, and playback starts. You can only view the picture on your camcorder. (Quasi PAL playback)

Recording a still image on a tape – Tape Photo recording

You can record still images on tapes with all the pixels in the progressive recording mode. See page 34 for details. This mode is useful when you print images using a video printer (optional).

Besides the operation described here, your camcorder can record still images on a “Memory Stick” (p. 121).

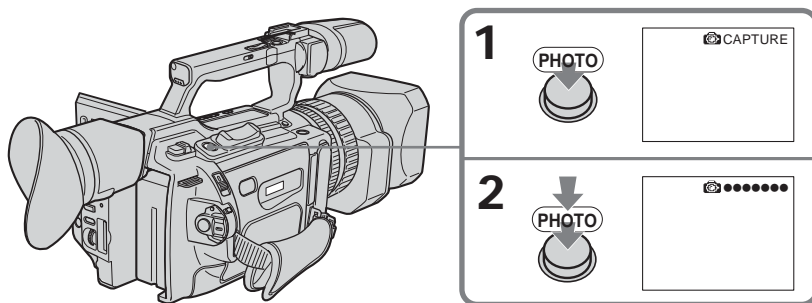
- (1) In standby mode, keep pressing PHOTO lightly until a picture freezes. The CAPTURE indicator appears. Recording does not start yet.

To change the image, release PHOTO, select an image again, and then press and hold PHOTO lightly.

- (2) Press PHOTO deeper.

The still image on the LCD screen or in the viewfinder is recorded for about seven seconds. The sound during those seven seconds is also recorded.

The still image is displayed on the LCD screen or in the viewfinder until recording is completed.



The number of still images recordable on a mini DV cassette

You can record about 510 images in SP mode and about 765 images in LP mode on a 60-minute cassette.

Notes

- During tape photo recording, you cannot change the mode or setting.
- The PHOTO button does not work:
 - While the fader function is set or in use.
 - While the digital effect function is set or in use.
- Do not shake the camcorder during tape photo recording. The recorded image may be blurred.

To do tape photo recording using the Remote Commander

Press PHOTO on the Remote Commander. Your camcorder immediately records an image on the LCD screen or in the viewfinder.

When you do tape photo recording during normal CAMERA recording

You cannot check an image on the LCD screen or in the viewfinder by pressing PHOTO lightly. Press PHOTO deeper. The still image is then recorded for about seven seconds and your camcorder returns to standby mode.



When shooting a moving object in Tape Photo recording

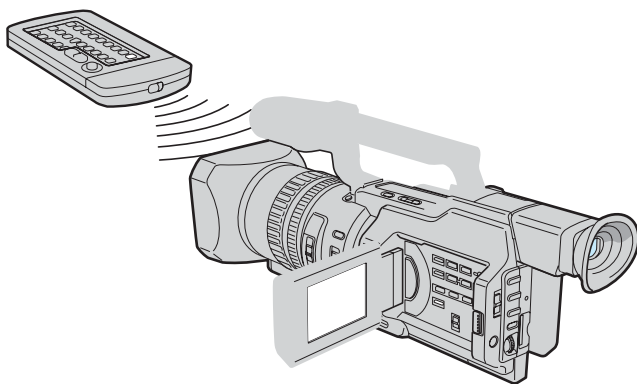
When playing back the image by another unit, the image may be blurred. This is not a malfunction.

Recording a still image on a tape – Tape Photo recording



Self-timer tape photo recording

You can make a tape photo recording with the self-timer. This mode is useful when you want to record yourself. You can also use the Remote Commander.

- (1) Press  (self-timer) in standby mode. The  (self-timer) indicator appears on the LCD screen or in the viewfinder.
- (2) Press PHOTO deeply.
Self-timer starts counting down from 10 with a beep sound. In the last two seconds of the countdown, the beep sound gets faster, then recording starts automatically.



To cancel self-timer recording

Press  (self-timer) so that the  indicator disappears from the LCD or viewfinder screen while your camcorder is in standby mode. You cannot cancel the self-timer recording using the Remote Commander.


Note

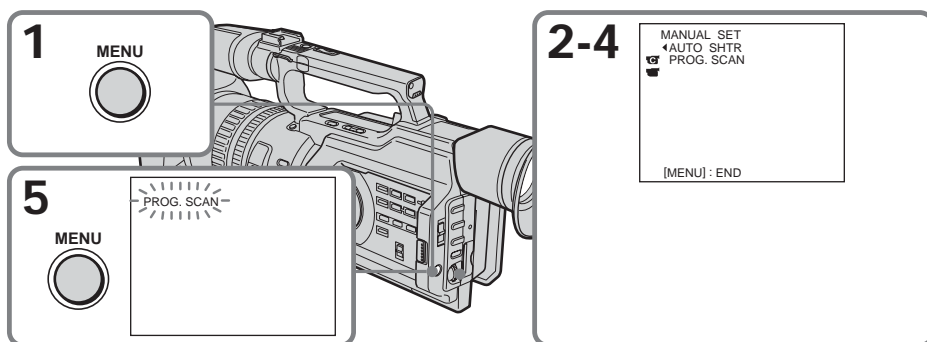
The self-timer recording mode is automatically canceled when:

- Self-timer tape photo recording is finished.
- The POWER switch is set to OFF (CHG) or VCR.

Shooting with all the pixels – PROG. SCAN

To import moving images to your PC to view still images, we recommend you record in progressive recording mode. To use progressive recording mode, follow the procedure below. Still images produced this way are more stable than those recorded on tapes in normal mode, and thus are more suitable for analyzing high-speed action such as sports scenes. (Since this camcorder takes in an image every 1/15 of a second in progressive recording mode, moving images recorded in this mode may be subject to too much jitter. To view moving images, we recommend recording in normal mode.)

- (1) Press MENU to display the menu in standby mode.
- (2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select PROG. SCAN, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
- (5) Press MENU to erase the menu display. The PROG. SCAN indicator lights up.



To return to normal recording mode

Select OFF in step 4, then press the SEL/PUSH EXEC dial.

Note on the progressive recording mode

A normal TV broadcast divides the screen into two finer fields and displays them in turns every 1/60 of a second (Interlace format). Thus, the actual image displayed in an instant covers only half of the apparent image area. Displaying the whole image simultaneously on a full screen is called displaying with all the pixels. In this mode, the resolution of the still picture is clearer than in the normal mode. This camcorder takes in an image every 1/15 of a second, which may cause the image of a moving object to go out of focus. This camcorder is originally programmed to record in the normal TV format.

When shooting under fluorescent light

When shooting in progressive recording mode under fluorescent light or light bulbs, a rare phenomenon may happen in which the screen lights up brightly (Flicker phenomenon). This is not a malfunction. If you want to stop this phenomenon, set PROG. SCAN to OFF in the menu settings.


In the progressive recording mode

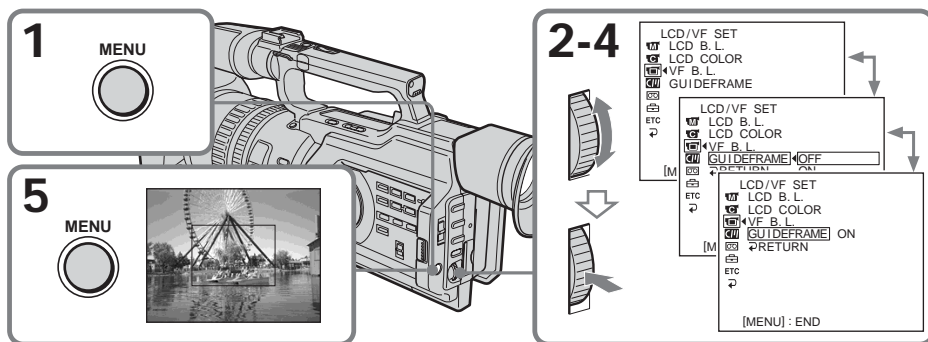
You cannot use the following operations:

- Digital zooming
- Wide mode

Using the guide frame

You can easily make the picture be on a horizontal line using the guide frame. The guide frame is not recorded.

- (1) Press MENU to display the menu in standby, recording, or memory mode.
- (2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select GUIDEFROME, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
- (5) Press MENU to erase the menu display. The guide frame is displayed on the LCD screen or in the viewfinder.



To clear the guide frame

Select OFF in step 4, then press the SEL/PUSH EXEC dial or simply press DISPLAY.

Note

The guide frame indicates only a rough level. The size and position of the guide frame do not affect the setting of the camcorder.

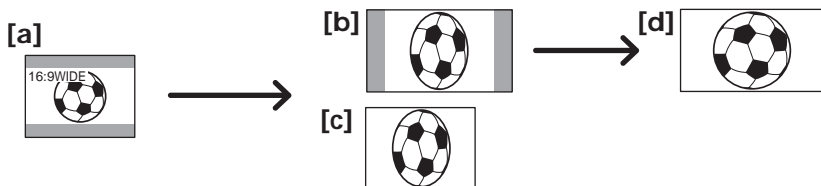
If you set GUIDEFROME to ON

The other screen indicators are also displayed on the LCD screen.

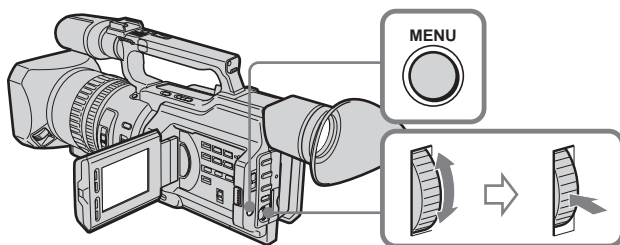
Using the wide mode

You can record a 16:9 wide picture to watch on a 16:9 wide-screen TV (16:9WIDE). Black bands appear on the screen during recording in the 16:9WIDE mode [a]. The picture during playing back in the 4:3 mode on a wide-screen TV [b] or a normal TV [c]* is compressed in the widthwise direction. If you set the screen mode of the wide-screen TV to the full mode, you can watch pictures of normal images [d].

* Played in 4:3 mode. When you play a picture in the wide mode, it appears as you have seen on the LCD screen or in the viewfinder [a].



In standby mode, set 16:9WIDE to ON in  in the menu settings (p. 109).



To cancel the wide mode

Set 16:9WIDE to OFF in the menu settings (p. 109).

In wide mode, you cannot select the following modes:

- Old movie
- Progressive recording mode

During recording

You cannot operate the wide mode function. When you cancel the wide mode, set your camcorder to the standby mode and then set 16:9WIDE to OFF in the menu settings.

Connection for a TV

Pictures recorded in the 16:9WIDE mode automatically appear on the TV screen at full size when:

- You connect your camcorder to a TV compatible with the video ID (ID-1/ID-2) system.
- You connect your camcorder to the S video jack on a TV.

ID-1 system

The ID-1 system sends aspect ratio information (16:9, 4:3 or letter box) using video signals.

If you connect a TV compatible with the ID-1 system, the screen size is automatically selected.

ID-2 system

The ID-2 system sends a copyright protection signal with ID-1 signals inserted between video signals when you connect your camcorder to other equipment using the A/V connecting cable.

Using the fader function

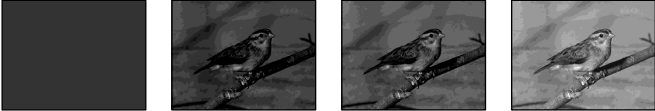
You can fade the picture in or out to give your recording a professional appearance.

[a]


STBY

REC

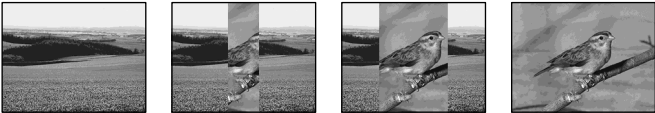
FADER



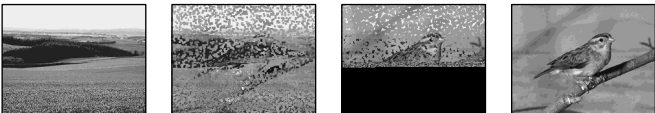
OVERLAP*



WIPE*



DOT*
(Random)



* Fade in only

[b]

STBY

REC

MONOTONE
When fading in, the picture gradually changes from black-and-white to color.
When fading out the picture gradually changes from color to black-and-white.

Using the fader function

(1) When fading in [a]

In standby mode, press FADER until the desired fader indicator flashes.

When fading out [b]

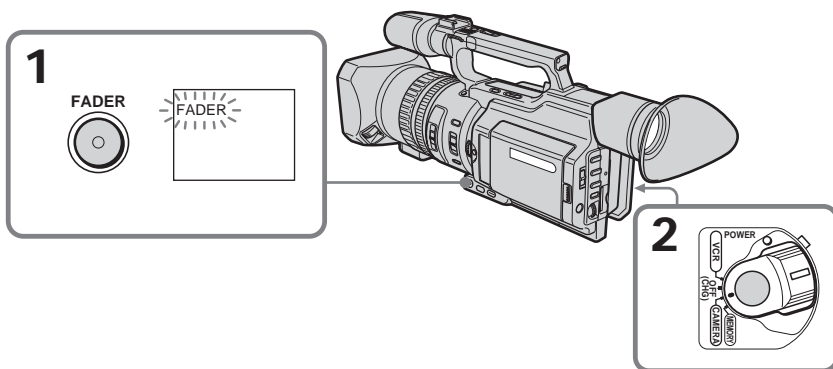
In recording mode, press FADER until the desired fader indicator flashes.

The indicator changes as follows:

FADER → MONOTONE → OVERLAP → WIPE → DOT → no indicator

The last selected fader mode is indicated first.

- (2) Press START/STOP. After the fade in/out is carried out, your camcorder automatically returns to the normal mode.



To cancel the fader function

Press FADER until the indicator disappears.

Note

You cannot use the following functions while using the fader function, and vice versa:

- Digital effect
- Low lux mode of PROGRAM AE (Only in OVERLAP, WIPE, or DOT mode)
- Tape Photo recording
- Interval recording
- Cut recording

When the OVERLAP, WIPE, or DOT indicator appears

Your camcorder automatically stores the image recorded on a tape. As the image is being stored, the fader indicator flashes fast, and the playback picture appears.

Using special effects – Picture effect

You can digitally process images to obtain special effects like those in films or on TV.

NEG. ART [a] : The color and brightness of the picture is reversed.

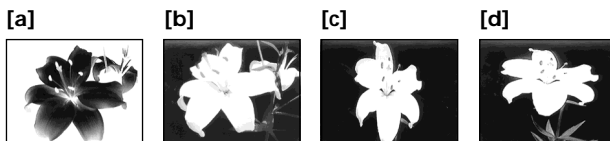
SEPIA : The picture gets sepia-toned.

B&W : The picture appears in monochrome (black-and-white).

SOLARIZE [b] : The light intensity is emphatic, and the picture looks like an illustration.

SLIM [c] : The picture expands vertically.

STRETCH [d] : The picture expands horizontally.

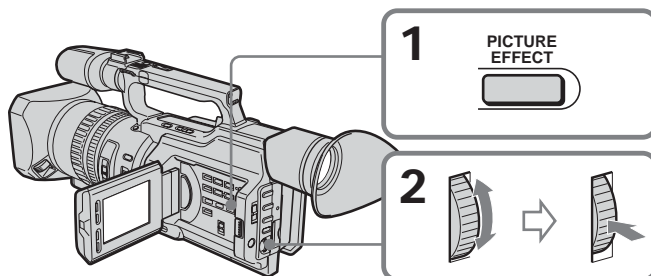


(1) In standby or recording mode, press PICTURE EFFECT.

(2) Turn the SEL/PUSH EXEC dial to select the desired picture effect mode.

The picture effect indicator changes as follows:

NEG. ART ↔ SEPIA ↔ B&W ↔ SOLARIZE ↔ SLIM ↔ STRETCH



To cancel the picture effect function

Press PICTURE EFFECT so that the indicator disappears.

While using the picture effect function

You cannot select the old movie mode.

When you turn the power off

The picture effect function will be automatically canceled.

When PROG. SCAN is set to ON in the menu settings

You cannot select SLIM and STRETCH.

Using special effects – Digital effect

You can add special effects to recorded pictures using the various digital functions. The sound is recorded normally.

STILL

You can record a still image so that it is superimposed on a moving picture.

FLASH (FLASH MOTION)

You can record still images successively at constant intervals.

LUMI. (LUMINANCEKEY)

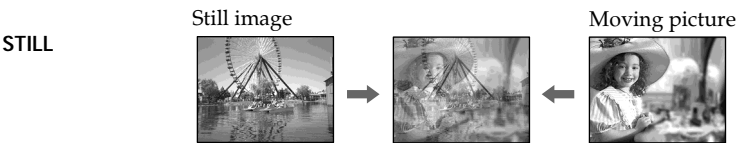
You can swap a brighter area in a still image with a moving picture.

TRAIL

You can record the picture so that an incidental image like a trail is left.

OLD MOVIE

You can add an old movie type atmosphere to pictures. The black bands appear on the upper and lower of the screen to change the virtual screen size to the cinemascope size, and the picture effect is set to SEPIA.



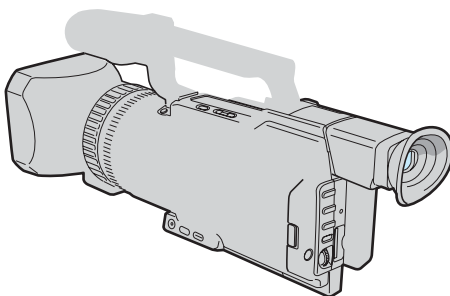
Using special effects – Digital effect

- (1) In standby or recording mode, press DIGITAL EFFECT. The digital effect indicator appears.
- (2) Turn the SEL/PUSH EXEC dial to select the desired digital effect mode.
The digital effect indicator changes as follows:
STILL ↔ FLASH ↔ LUMI. ↔ TRAIL ↔ OLD MOVIE
- (3) Press the SEL/PUSH EXEC dial. The indicator lights up and the bar appears.
In STILL and LUMI. modes, the still image is stored in memory.
- (4) Turn the SEL/PUSH EXEC dial to adjust the effect.

Items to be adjusted

STILL	The rate of the still image you want to superimpose on the moving picture
FLASH	The interval of flash motion
LUMI.	The color scheme of the area in the still image which is to be swapped with a moving picture
TRAIL	The time until the incidental image vanishes
OLD MOVIE	No adjustment necessary

The longer the bar on the screen, the stronger the digital effect. The bar appears in the following modes: STILL, FLASH, LUMI. and TRAIL.



To cancel the digital effect

Press DIGITAL EFFECT. The digital effect indicator disappears.

Using special effects – Digital effect

Notes

- The following functions do not work in digital effect mode:
 - Fader
 - Low lux mode of PROGRAM AE
 - Tape Photo recording
 - Shutter speed (1/30 or smaller) adjustment
- The following functions do not work in old movie mode:
 - Wide mode
 - Picture effect
 - PROGRAM AE
 - Spot light mode
 - Shutter speed adjustment

When you turn the power off

The digital effect function will be automatically canceled.

Shooting with manual adjustment

Under normal conditions, this unit automatically makes various adjustments as it shoots. However, you can adjust the following functions manually to suit your preference.

Functions you can adjust by setting the AUTO LOCK selector to the center (auto lock release) position

Brightness (exposure), shutter speed, white balance, and PROGRAM AE

Functions you can adjust in menu settings

Deactivating the SteadyShot

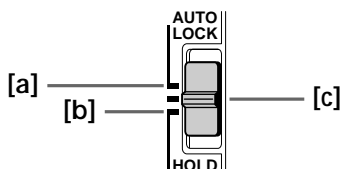
Functions you can adjust by using other selectors/rings

ND filter, zebra pattern, focus, and zoom

The following describes how to adjust all the functions mentioned above except white balance (p. 50), PROGRAM AE (p. 56), focus (p. 59), and zoom (p. 21).

AUTO LOCK selector

Set the selector as shown below to maintain or release the settings of the functions.



AUTO LOCK [a]

Select this position to let the unit adjust all the functions automatically.

HOLD [b]

Select this position after setting the functions manually to maintain the settings.

Manual position (AUTO LOCK release) [c]

Select this position to adjust the functions listed above manually.

If you use the video flash light (optional)

We recommend that you set the AUTO LOCK selector to AUTO LOCK.

Note

When you manually adjust the exposure during backlight or spot light mode, the backlight or spot light function will be automatically canceled.

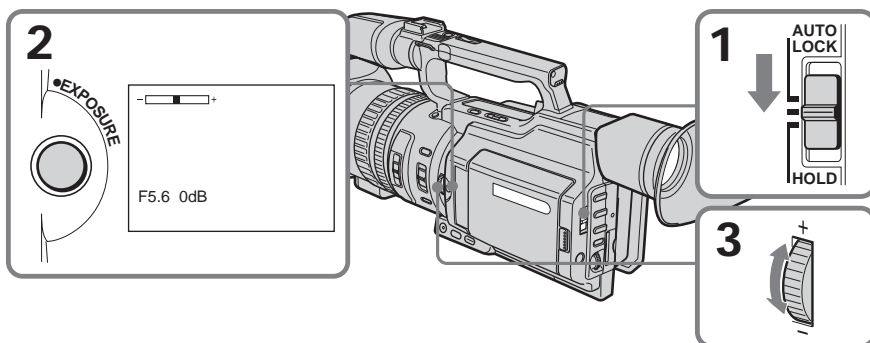
Shooting with manual adjustment

Adjusting exposure

Adjust the exposure manually under the following cases.

- The background is too bright (back lighting)
- Insufficient light: most of the picture is dark
- Bright subject and dark background
- To record the darkness faithfully

- (1) Set the AUTO LOCK selector to the center (auto lock release) position while the camcorder is in standby, recording, or memory mode.
- (2) Press EXPOSURE. The exposure indicator appears on the LCD screen or in the viewfinder.
- (3) Turn the EXPOSURE dial to adjust the exposure.
As you turn the dial, the iris value changes between OPEN and CLOSE and the gain value changes between 0 dB and 18dB.
To brighten the picture, adjust the level to the + side.



To return to automatic exposure mode

Set the AUTO LOCK selector to AUTO LOCK or press EXPOSURE. The exposure indicator disappears from the LCD or viewfinder screen.

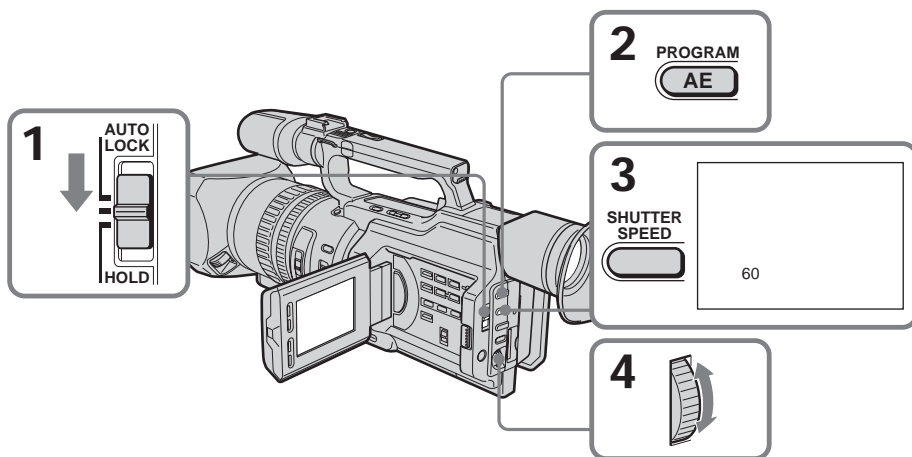
If you press PROGRAM AE when adjusting the exposure manually

The exposure comes back to automatic adjustment again.

Shooting with manual adjustment

Adjusting the shutter speed

- (1) Set the AUTO LOCK selector to the center (auto lock release) position while the camcorder is in standby, recording, or memory mode.
- (2) If the PROGRAM AE indicator is lit, press PROGRAM AE repeatedly until the indicator disappears from the LCD or viewfinder screen.
- (3) Press SHUTTER SPEED. The shutter speed indicator appears on the LCD screen or in the viewfinder.
- (4) Turn the SEL/PUSH EXEC dial to select the desired speed. The available shutter speed ranges from 1/4 to 1/10000. As you turn the dial, the shutter speed changes as follows:
1/4 ↔ 1/8 ↔ 1/15 ↔ 1/30 ↔ ... ↔ 1/4000 ↔ 1/6000 ↔ 1/10000
To increase the shutter speed, select a smaller setting (large value indicator on the LCD screen or in the viewfinder).



To return to automatic shutter speed mode

Set the AUTO LOCK selector to AUTO LOCK or press SHUTTER SPEED. The shutter speed indicator disappears from the LCD or viewfinder screen.

When shooting at slow shutter speed

At slow shutter speed, automatic focus may be lost. Use a tripod and adjust the focus manually.

When shooting under fluorescent light or light bulbs

When shooting under fluorescent light or light bulbs, a rare phenomenon may happen in which the screen lights up brightly depending on the shutter speed (Flicker phenomenon).

If you set the shutter speed value to 1/30 or smaller

You cannot use the spot light (p. 24) and digital effect (p. 41) functions.

Shooting with manual adjustment

Using the ND filter

Using the ND filter (the ND filter 1 setting corresponds to $1/4$ of the quantity of light and the ND filter 2 setting corresponds to $1/32$ of the quantity of light), you can record a picture clearly by adjusting light amounts, even if you shoot under too bright conditions.

When the ND1 or ND2 indicator flashes on the LCD screen or in the viewfinder

The ND filter is necessary.

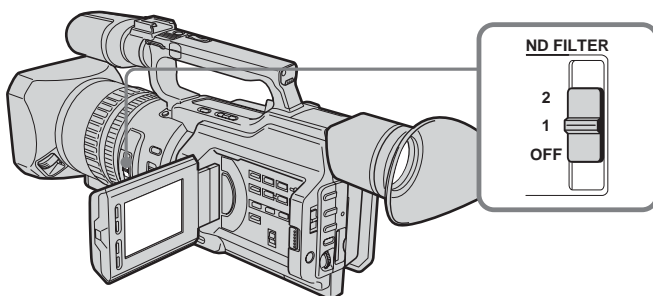
When ND 1 flashes, set the ND FILTER selector to 1 so that the ND 1 indicator lights up on the LCD screen or in the viewfinder.

When ND 2 flashes, set the ND FILTER selector to 2 so that the ND 2 indicator lights up on the LCD screen or in the viewfinder.

When ND OFF flashes on the LCD screen or in the viewfinder

The ND filter is not necessary. Set the ND FILTER selector to OFF so that the indicator disappears from the LCD or viewfinder screen.

The ND filter is now deactivated.



Notes

- If you set the ND FILTER selector to another positions during recording, the picture may be blurred or audio noise may occur. We recommend that you check the position of the ND FILTER selector before shooting.
- When shooting a too bright object, diffraction off the small aperture may cause slight off set in focusing. This phenomenon is quite common with a use of a video camera recorder. Using the ND filter will reduce influence of such phenomenon, and you can attain a better shooting condition.

If you use the video flash light (optional)

Set the ND FILTER selector to OFF when you use the flash.

Shooting with manual adjustment

Shooting with the zebra pattern

You can set the camcorder to display a zebra pattern (diagonal stripes) in the portion of the picture on the LCD screen or in the viewfinder with a subject whose brightness exceeds a certain level. When the ZEBRA selector is set to 100, the portion of the picture where zebra pattern appears is an area of high brightness and overexposure. You can check the picture level of a subject by displaying the zebra pattern. Use the zebra pattern as a guide for adjusting the exposure and shutter speed so that you can get the desired picture.

Set the ZEBRA selector to 70 or 100 in standby or memory mode.

Setting	Meaning
70	The zebra pattern appears in the portion of the picture on the LCD screen or in the viewfinder with a subject whose brightness is about 70 IRE.
100	The zebra pattern appears in the portion of the picture on the LCD screen or in the viewfinder with a subject whose brightness exceeds more than 100 IRE.
OFF	The zebra pattern does not appear on the LCD screen or in the viewfinder.

To erase the zebra pattern

Set the ZEBRA selector to OFF.


Note on shooting with the zebra pattern


Even though you see the zebra pattern on the LCD screen or in the viewfinder, the zebra pattern is not recorded.

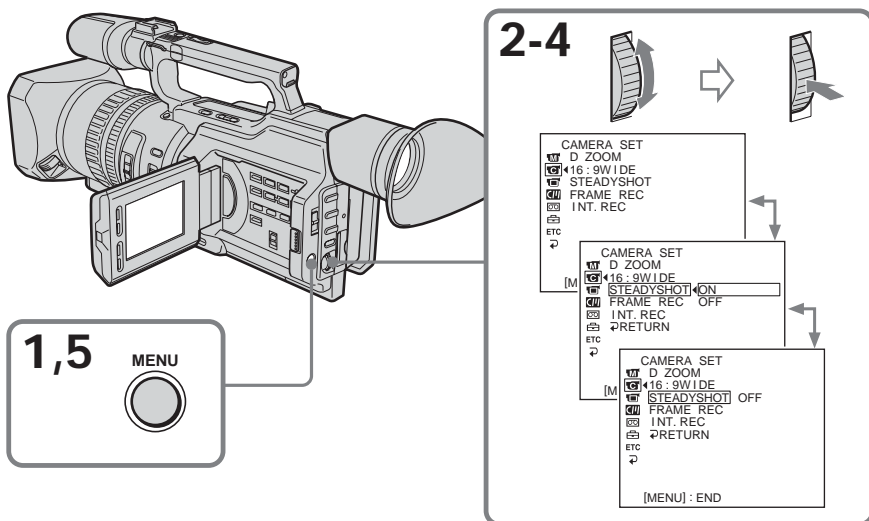
Shooting with manual adjustment

Releasing the SteadyShot function

When the SteadyShot function is working, the camcorder compensates for camera-shake.

You can release the SteadyShot function when you do not need to use it. The  indicator appears on the LCD screen or in the viewfinder. Do not use the SteadyShot function when shooting a stationary object with a tripod.

- (1) Press MENU to display the menu in standby or memory mode.
- (2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select STEADYSHOT, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select OFF, then press the dial.
- (5) Press MENU to erase the menu display.



To activate the SteadyShot function again

Select ON in step 4, then press the SEL/PUSH EXEC dial.

Notes on the SteadyShot function

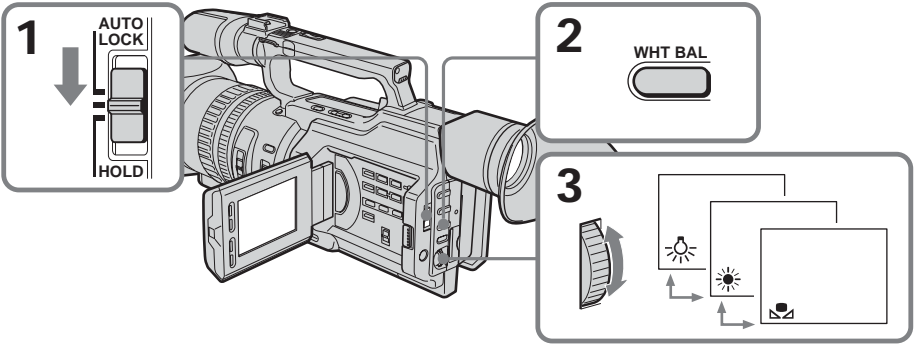
- The SteadyShot function will not correct excessive camera-shake.
- If you use a tele conversion lens (optional) or a wide conversion lens (optional), these lens may influence the SteadyShot function.

Adjusting the white balance

White balance adjustment makes white subjects look white and allows more natural color balance for camera recording. Normally, white balance is automatically adjusted. You can obtain better results by adjusting the white balance manually when lighting conditions change quickly or when recording outdoors: e.g., neon signs, fireworks.

- (1) Set the AUTO LOCK selector to the center (auto lock release) position while the camcorder is in standby, recording, or memory mode.
- (2) Press WHT BAL. The white balance indicator appears on the LCD screen or in the viewfinder.
- (3) Turn the SEL/PUSH EXEC dial to select the appropriate white balance mode under the following conditions. As you turn the dial, the display changes as follows:

📷 (One-push white balance) ↔ ☀ (Outdoor) ↔ 💡 (Indoor)




Indicator	Shooting conditions
📷	<ul style="list-style-type: none">Adjusting the white balance according to the light source. This operation is not available during recording. Follow the procedure described on the next page to adjust the setting again.
☀ (Outdoor)	<ul style="list-style-type: none">Recording a sunset/sunrise, just after sunset, just before sunrise, neon signs, or fireworksUnder a color matching fluorescent lamp
💡 (Indoor)	<ul style="list-style-type: none">Lighting condition changes quicklyToo bright a place such as a photography studioUnder sodium lamps or mercury lamps

Adjusting the white balance


If you have selected in step 3

When you set the white balance to one-push white balance mode, the setting is locked and maintained even if lighting conditions change. You can achieve recording with natural colors without the image being affected by ambient light.

(With the  indicator on the screen)

(1) Aim a white object such as paper fully.




(2) Press the SEL/PUSH EXEC dial.

The  indicator flashes quickly. When the white balance has been adjusted and stored in the memory, the indicator stops flashing. The setting will be maintained even if the battery is detached.

To return to automatic adjustment

Set the AUTO LOCK selector to AUTO LOCK or press WHT BAL. The white balance indicator disappears from the LCD or viewfinder screen.

Notes on white balance

- When you shoot with studio lighting or video lighting, use the  (indoor) mode.
- When you shoot with fluorescent lighting, readjust the white balance using the  (one-push white balance) mode, or use the automatic white balance mode. If you use the  (indoor) mode, white balance may not be adjusted appropriately.

Shooting when lighting conditions have changed

- When lighting conditions have changed, readjust the white balance while the camcorder is in standby mode.
- In automatic white balance mode, point your camcorder at a white subject for about 10 seconds after setting the POWER switch to CAMERA to get a better adjustment when:
 - You detach the battery for replacement.
 - You bring your camcorder outdoors from the interior of a house, or vice versa.


If the indicator does not stop flashing after you press the SEL/PUSH EXEC dial

The white balance cannot be set. Use the automatic white balance mode.

Adjusting recording level manually – Sound recording level

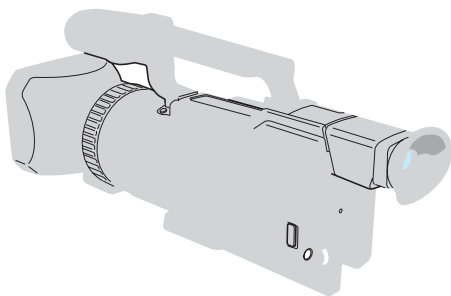
You can adjust the recording sound level. Use headphones to monitor the sound when you adjust it.

Setting up the menu

- (1) Set the POWER switch to CAMERA or VCR.
- (2) Press MENU to display the menu.
- (3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select MIC LEVEL, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select MANUAL, then press the dial.
- (6) Press MENU to erase the menu display.

Adjusting the recording level

- (7) Press AUDIO LEVEL to display the recording level adjustment display in standby or recording mode.
- (8) Turn the SEL/PUSH EXEC dial to adjust the recording level.



[a] Recording level meter

[b] Decreases the recording level

[c] Increases the recording level

To clear the recording level adjustment display

Press AUDIO LEVEL again.

To adjust the recording level automatically

Select AUTO in step 5, then press the SEL/PUSH EXEC dial.

Adjusting recording level manually – Sound recording level

Notes on the manual adjustment

- The recording level setting is retained for about five minutes after removing the battery.
- The recording level indicator appears at the lower-right on the LCD screen or in the viewfinder.

The sound input through the AUDIO L/R jacks or i DV Interface

You cannot adjust the recording level.

When MIC LEVEL is set to AUTO

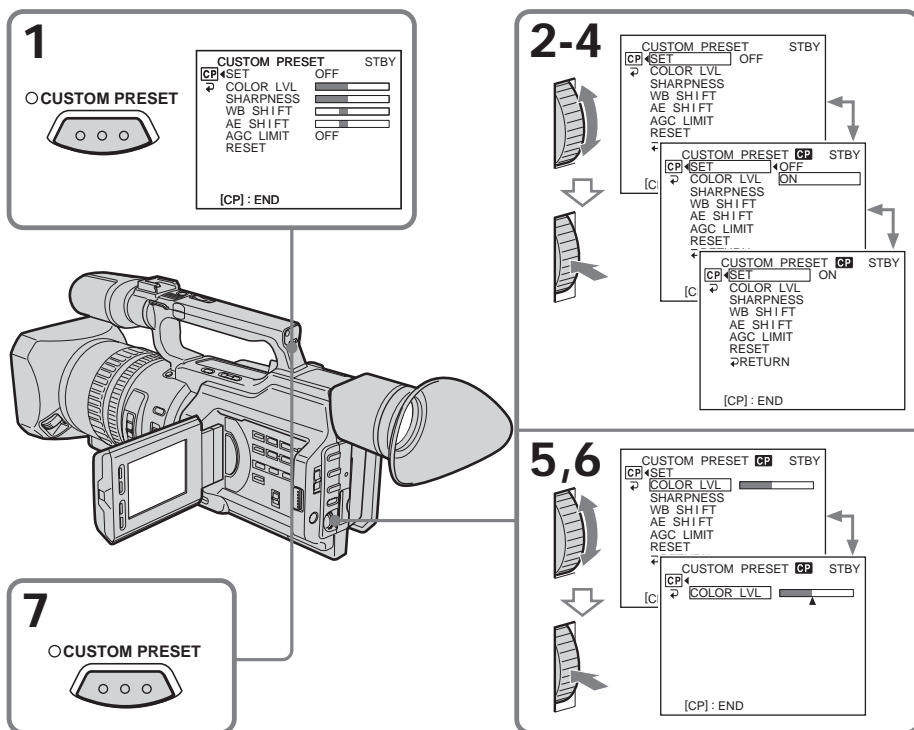
You cannot adjust the recording level, however, the recording level adjustment display is displayed.

Presetting the adjustment for picture quality – Custom preset

You can preset the camcorder to record the picture with the desired picture quality. When presetting, adjust the picture by shooting a subject and checking the picture displayed on a TV using the menu settings.

- (1) Press CUSTOM PRESET to display the CUSTOM PRESET menu in standby or memory mode.
- (2) Press the SEL/PUSH EXEC dial.
- (3) Turn the SEL/PUSH EXEC dial to select SET, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select the desired item, then press the dial.
- (6) Turn the SEL/PUSH EXEC dial to adjust the selected item, then press the dial.
- (7) Press CUSTOM PRESET.

The CUSTOM PRESET menu disappears and the indicator **CP** appears on the LCD screen or in the viewfinder.



Presetting the adjustment for picture quality

Items to be adjusted

Item	Meaning	Adjustment value
COLOR LVL	Color intensity	Decreases color intensity ↔ Increases color intensity
SHARPNESS	Sharpness	Softer ↔ Sharper
WB SHIFT	White balance	Bluish ↔ Reddish
AE SHIFT	Brightness	-4 ↔ +4
AGC LIMIT	Auto Gain-limit	6 dB/12 dB/OFF
RESET	Sets items above to the default settings.	

To cancel using the custom preset

Select OFF in step 4, then press the SEL/PUSH EXEC dial.

To return to the standard setting

Select OK from the RESET item in step 5, then press the SEL/PUSH EXEC dial. To cancel, select RETURN, then press the SEL/PUSH EXEC dial.

To check the custom preset setting

Press CUSTOM PRESET while the camcorder is in standby, recording or memory mode.

The custom preset setting appears on the LCD screen or in the viewfinder.

Once you adjust AE shift

You can adjust the brightness of the picture according to recording circumstances or objects.

About the AGC Limit

When adjusting the exposure manually, the level of the gain is up to 18 dB (OFF).

When you preset the desired picture quality in CAMERA or memory mode

The preset is only available in each mode you preset. If you want to use a preset both in CAMERA and memory modes, you have to preset in each mode.

Using the PROGRAM AE function

You can select from five PROGRAM AE (Auto Exposure) modes to suit your shooting situation, referring to the following.

Selecting the best mode

Select a proper PROGRAM AE mode referring to the following description.



AE A: Aperture priority mode

Selecting the aperture to determine the desired depth of field. Gain and shutter speed are automatically set in combination with the aperture value to maintain appropriate exposure.

AE S: Shutter speed priority mode

Selecting the shutter speed manually. The exposure value changes in accordance with the selected shutter speed.

⚡: Sports lesson mode

Capturing high-speed action in sports such as golf or tennis

☾: Sunset & Moon mode

Recording sunset, night views, fireworks or neon signs

🌙: Low lux mode

For recording a subject in insufficient light. Subject becomes bright.

Using the PROGRAM AE function

Using the PROGRAM AE function

- (1) Set the AUTO LOCK selector to the center (auto lock release) position while the camcorder is in standby, recording, or memory mode.
- (2) Press PROGRAM AE. The PROGRAM AE indicator appears on the LCD screen or in the viewfinder.
- (3) Turn the SEL/PUSH EXEC dial to select the desired PROGRAM AE mode. The PROGRAM AE mode changes as follows:
Aperture priority mode ↔ Shutter speed priority mode ↔ Sports lesson mode ↔ Sunset & Moon mode ↔ Low lux mode
When you select the aperture priority mode or the shutter speed priority mode, press the SEL/PUSH EXEC dial.
- (4) In aperture priority mode (AE A) or shutter speed priority mode (AE S), turn the SEL/PUSH EXEC dial to select the desired aperture value (F value) or shutter speed.

Aperture priority mode:

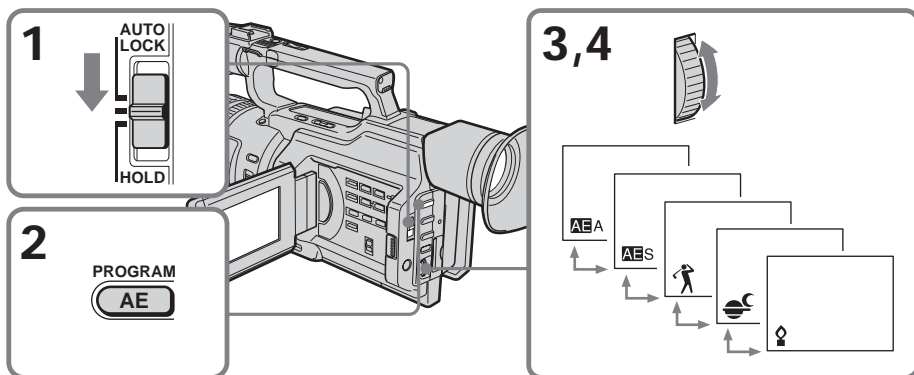
Turn the SEL/PUSH EXEC dial to select the desired aperture value. As you turn the dial, the F value changes between F1.6 and F11.

For a smaller aperture, select a higher value. The gain and shutter speed change in accordance with the selected aperture value.

Shutter speed priority mode:

Turn the SEL/PUSH EXEC dial to select the desired shutter speed. As you turn the dial, shutter speed changes between 1/60 and 1/10000.

For a faster shutter speed, select a smaller value indicator on the LCD screen or in the viewfinder. The gain and aperture values change in accordance with the selected shutter speed.



To cancel using the PROGRAM AE function

Set the AUTO LOCK selector to AUTO LOCK or press PROGRAM AE. The PROGRAM AE indicator disappears from the LCD or viewfinder screen.

Using the PROGRAM AE function

Notes

- In sports lesson mode, you cannot take close-ups. This is because your camcorder is set to focus only on subjects in the middle to far distance.
- In sunset & moon mode, your camcorder is set to focus only on distant subjects.
- The old movie mode and the shutter speed adjustment do not work in PROGRAM AE mode.
- The following functions do not work in low lux mode:
 - Digital effect
 - Overlap
 - Wipe
 - Dot
 - Spot light mode
- While shooting in memory mode, the low lux and sports lesson modes do not work. (The indicator flashes.)

If you are recording under a discharge tube such as a fluorescent lamp, sodium lamp or mercury lamp

Flickering or changes in color may occur in sports lesson mode. If this happens, turn the PROGRAM AE function off.

Even if the PROGRAM AE function is selected

You can adjust the exposure.

When you focus in telephoto

You cannot choose F1.6 and F2.

About the depth of field

The depth of field is the in-focus range, measured from the distance behind a subject to the distance in front. The depth of field can vary with the iris (F value) and the focal length. Lowering the F value (large iris) reduces the depth of field. Raising the F value (small iris) provides a larger depth of field. Zooming in telephoto position offers a smaller depth of field while the depth of field in the wide-angle position is greater.


The depth of field	Shallow	Deep
Iris	Near open (Low F value)	Near close (High F value)
Zoom	Telephoto (T)	Wide (W)

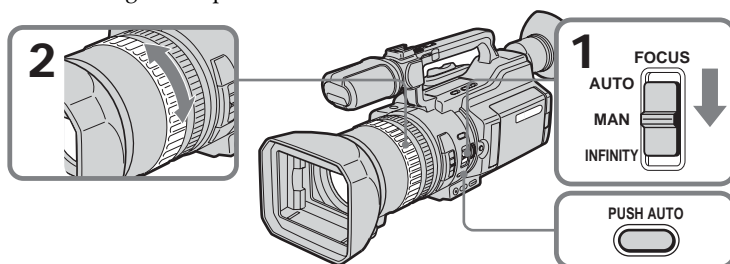
Focusing manually

You can gain better results by manually adjusting the focus in the following cases:



- The autofocus mode is not effective when shooting
 - subjects through glass coated with water droplets
 - horizontal stripes
 - subjects with little contrast with backgrounds such as walls and sky
- When you want to change the focus from a subject in the foreground to a subject in the background
- Shooting a stationary subject when using a tripod




- (1) Slide FOCUS down to MANUAL in standby, recording, or memory mode. The  indicator appears on the LCD screen or in the viewfinder in recording, standby, or memory mode.
- (2) Turn the focus ring to sharpen the focus.



To return to the autofocus mode

Slide FOCUS up to AUTO to turn off the  or  indicator.

To focus in infinity

Slide FOCUS to INFINITY. The  indicator appears on the LCD screen or in the viewfinder. This function is useful when the nearer subject is focused automatically, even though you want to focus on a faraway subject.

To shoot with auto focusing momentarily

Press PUSH AUTO.

The auto focus functions while you are pressing PUSH AUTO.

Use this button to focus on one subject and then another with smooth focusing.


When you release PUSH AUTO, manual focusing resumes.


To obtain the correct focus


First, focus on a subject manually with the zoom set toward the "T" (telephoto) side, then adjust the zoom by pressing the "W" side of the lever gradually.

When you shoot close to the subject

Focus at the end of the "W" (wide-angle) position.

 changes as follows:

 when recording a distant subject.



 when the subject is too close to focus on.

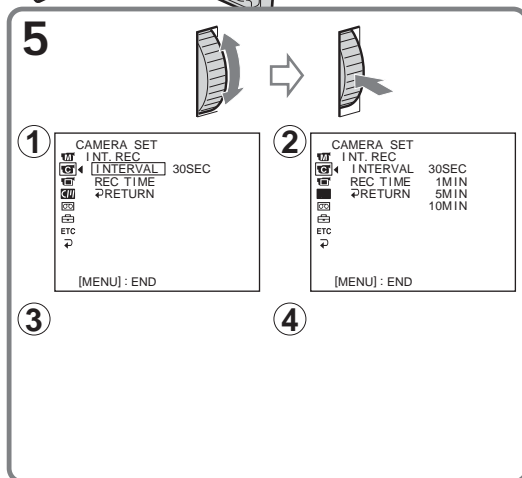
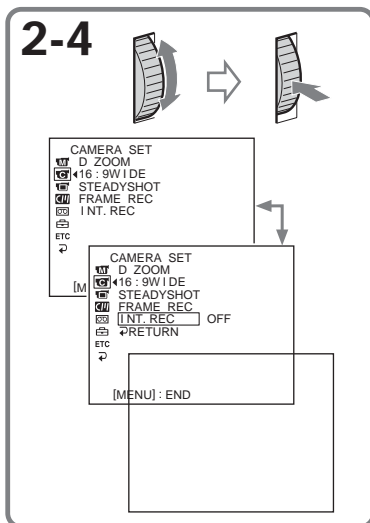
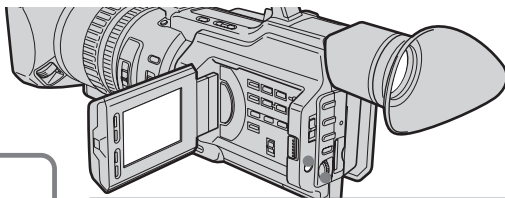
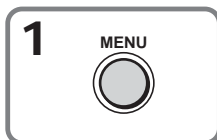
Interval recording

You can make a time-lapse recording by setting the camcorder to automatically record and standby sequentially. You can achieve an excellent recording for flowering, emergence, etc., with this function.

[a] Recording time

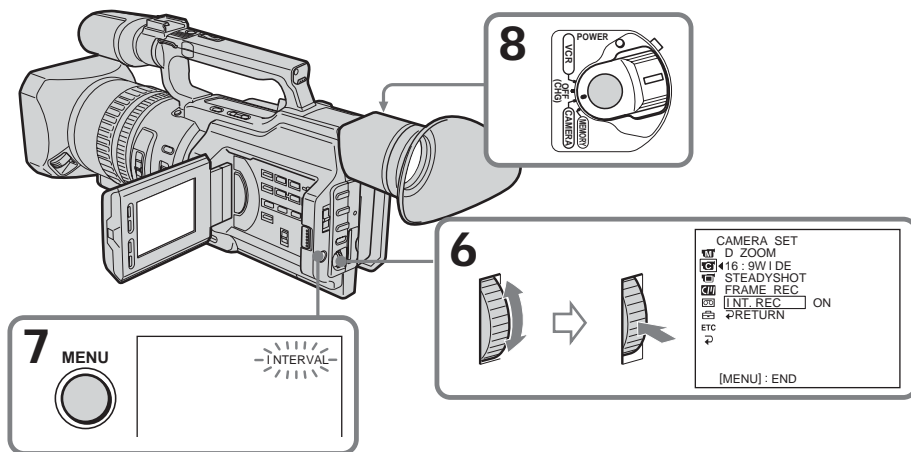
[b] Waiting time

- (1) Press MENU to display the menu in standby mode.
- (2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select INT. REC, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select SET, then press the dial.
- (5) Set INTERVAL and REC TIME.
 - ① Turn the SEL/PUSH EXEC dial to select INTERVAL, then press the dial.
 - ② Turn the SEL/PUSH EXEC dial to select the desired interval time, then press the dial.
The time: 30SEC ↔ 1MIN ↔ 5MIN ↔ 10MIN
 - ③ Turn the SEL/PUSH EXEC dial to select REC TIME, then press the dial.
 - ④ Turn the SEL/PUSH EXEC dial to select the desired recording time, then press the dial.
The time: 0.5SEC ↔ 1SEC ↔ 1.5SEC ↔ 2SEC
 - ⑤ Turn the SEL/PUSH EXEC dial to select  RETURN, then press the dial twice.



Interval recording

- (6) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
- (7) Press MENU to erase the menu display. The interval recording indicator flashes.
- (8) Press START/STOP to start interval recording. The interval recording indicator lights up.



To cancel the interval recording

- Set INT. REC to OFF in the menu settings.
- Set the POWER switch to OFF (CHG), VCR or MEMORY.

To stop the interval recording momentarily and perform normal recording

Press START/STOP. You can perform normal recording only once. To cancel the normal recording, press START/STOP again.

Note on interval recording

You cannot do interval recording in memory mode.

On recording time


There may be a discrepancy in recording time of up to ± 6 frames from the selected time.

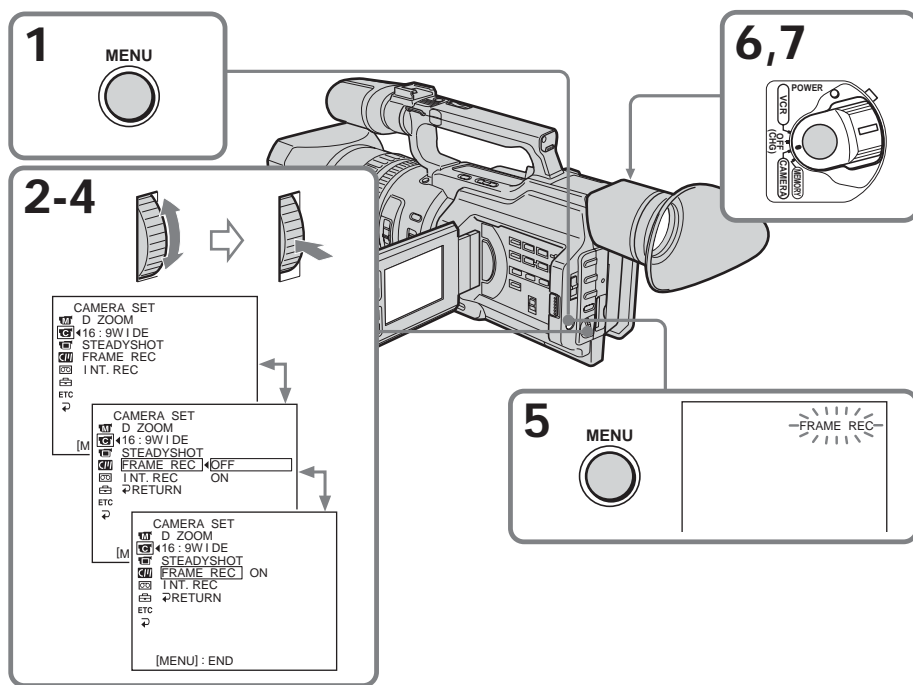
Even if you press INDEX MARK during interval recording

You cannot mark an index.

Frame by frame recording – Cut recording

You can make a recording with a stop-motion animated effect using cut recording. To create this effect, alternately move the subject a little and make a cut recording. We recommend that you use a tripod, and operate the camcorder using the Remote Commander after step 6.

- (1) Press MENU to display the menu in standby mode.
- (2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select FRAME REC, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
- (5) Press MENU to erase the menu display.
The FRAME REC indicator lights up.
- (6) Press START/STOP to start cut recording. The camcorder makes a recording for about six frames, and returns to recording standby.
- (7) Move the subject, and repeat step 6.



To cancel the cut recording

- Set FRAME REC to OFF in the menu settings.
- Set the POWER switch to OFF (CHG), VCR, or MEMORY.

Notes on cut recording

- The last recorded cut is longer than other cuts.
- The proper remaining tape time is not indicated if you use this function continuously.
- You cannot mark an index during cut recording.

Marking an Index

If you mark an index at the scene you want to search for, you can easily search for the scene later (p. 65).

In recording mode [a]:

Press INDEX MARK.

The “INDEX MARK” indicator appears on the LCD screen or in the viewfinder for seven seconds and the index is marked after the indicator disappears.

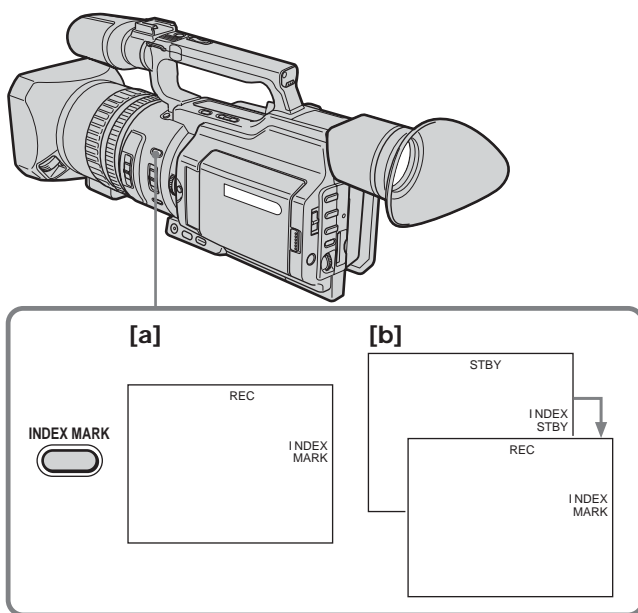
In standby mode [b]:

Press INDEX MARK.

The “INDEX STBY” indicator appears on the LCD screen or in the viewfinder. And when you press START/STOP to start recording, the “INDEX STBY” indicator changes to “INDEX MARK” and after the indicator disappears, the index marking is complete.

The camcorder starts index-marking at the 11th frame from the recording start point. An index signal will be recorded on cassette memory about 0.3 sec, and on a tape about five seconds.

You can mark an index in VCR mode (p. 90).



To cancel index marking

Press INDEX MARK again in standby mode.

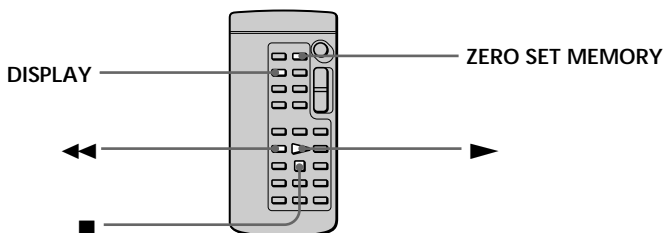
Notes on the index

- Index marks are recorded during recording, you cannot mark an index after recording.
- Index signals will be recorded both on the tape and on cassette memory. If you use cassettes without cassette memory or the cassette memory is full, the signals will be recorded only on the tape.
- When you record over the recorded tape and mark an index on the tape, we recommend that you clear all data in the cassette memory before marking an index.

Quickly locating a scene using the zero set memory function

Using the zero set memory function, your camcorder rewinds or advances the tape to locate the desired scene, and the searching automatically stops at the scene having a tape counter value of "0:00:00." You can do this with the Remote Commander.

- (1) In playback mode, press DISPLAY if the counter is not on the LCD screen or in the viewfinder.
- (2) Press ZERO SET MEMORY at the point you want to locate later. The tape counter shows "0:00:00" and the ZERO SET MEMORY indicator flashes.
- (3) Press ■ when you want to stop playback.
- (4) Press ◀◀ to rewind the tape to the tape counter's zero point. The tape stops automatically when the tape counter reaches approximately zero. The ZERO SET MEMORY indicator disappears and the time code appears.
- (5) Press ▶▶. Playback starts.



Notes

- When you press ZERO SET MEMORY again before rewinding the tape, the zero set memory function will be canceled.
- There may be a discrepancy of several seconds from the time code.

When there is a blank portion between pictures on a tape

The zero set memory function may not work.

ZERO SET MEMORY functions also in standby mode

When you insert a scene in the middle of a recorded tape, press ZERO SET MEMORY at the point you want to end the insertion. Rewind the tape to the insert start point, and start recording. Recording stops automatically at the tape counter zero point. Your camcorder returns to standby mode.




Searching for a reco

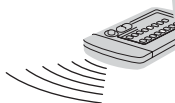
- Index search

You can automatically search for the j from that point (**Index search**). Use a the Remote Commander for this opera Use this function to check where inde sequence where the index is marked.

Searching for the index point us

You can use this function only when pl


- (1) Set the POWER switch to VCR.
- (2) Set CM SEARCH in  to ON in t is ON.
- (3) Press SEARCH MODE on the Rem search indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH
→ PHOTO SCAN → no indicator
- (4) Press  or  on the Remote C playback.
Your camcorder automatically starts





To stop searching

Press .

Searching for a recording by index – Index search

In the  mark

- The bar in the  mark indicates the present point on the tape.
- The **X** mark in the  indicates the actual point you are trying to search for.

If a tape has a blank portion between recorded portions

The index search function may not work correctly.


If you mark an index onto an external input signal

“LINE” appears in the CH column.

The index of the recording start point when recorded from external audio equipment

The index mark is not recorded in cassette memory when recorded from external audio equipment. If you want to search for the index point, set CM SEARCH to OFF in the menu settings and search for the index point without cassette memory.

Searching for the index point without using cassette memory

- (1) Set the POWER switch to VCR.
- (2) Set CM SEARCH in  to OFF in the menu settings (p. 109). If using a tape without cassette memory, skip this step.
- (3) Press SEARCH MODE on the Remote Commander repeatedly, until the index search indicator appears.
The indicator changes as follows:
INDEX SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN
→ no indicator
- (4) Press **◀◀** on the Remote Commander to search for the previous index point or press **▶▶** on the Remote Commander to search for the next index point.
Your camcorder automatically starts playback at the selected index point. Each time you press **◀◀** or **▶▶**, your camcorder searches for the previous or next index point.




To stop searching

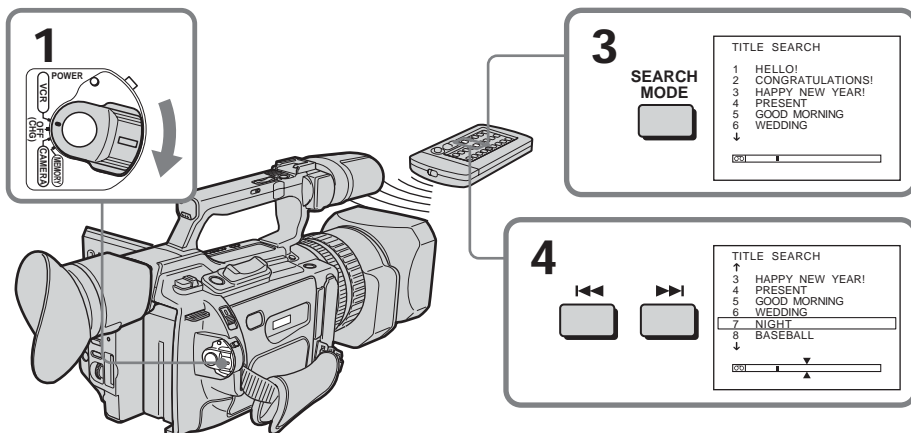
Press **■**.

Searching the boundaries of recorded tape by title – Title search

CM
only

If you use a tape with cassette memory, you can search for the boundaries of recorded tape by title (**Title search**) (p. 144). Use the Remote Commander for this operation.

- (1) Set the POWER switch to VCR.
- (2) Set CM SEARCH in  to ON in the menu settings (p. 109). The default setting is ON.
- (3) Press SEARCH MODE on the Remote Commander repeatedly, until the title search indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator
- (4) Press  or  on the Remote Commander to select the title for playback.
Your camcorder automatically starts playback of the scene having the title that you selected.







To stop searching

Press .

If you use a tape without cassette memory

You cannot superimpose or search for a title.

In the  mark

- The bar in the  mark indicates the present point on the tape.
- The  mark in the  indicates the actual point you are trying to search for.

If a tape has a blank portion between recorded portions

The title search function may not work correctly.




Searching a recording by date

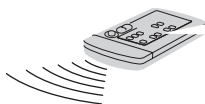
- Date search

You can automatically search for the point where the recording date changes and start playback from that point (**Date search**). Use a tape with cassette memory for convenience. Use the Remote Commander for this operation. Use this function to check where recording dates change or to edit the tape at each recording date.

Searching for the date using cassette memory

You can use this function only when playing back a tape with cassette memory (p. 144).

- (1) Set the POWER switch to VCR.
- (2) Set CM SEARCH in  to ON in the menu settings (p. 109). The default setting is ON.
- (3) Press SEARCH MODE on the Remote Commander repeatedly, until the date search indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator
- (4) Press  or  on the Remote Commander to select the date for playback. Your camcorder automatically starts playback at the beginning of the selected date.



To stop searching




Press .

Searching a recording by date – Date search

Note

If one day's recording is less than two minutes, your camcorder may not accurately find the point where the recording date changes.






In the mark

- The bar in the  mark indicates the present point on the tape.
- The  mark in the  indicates the actual point you are trying to search.

If a tape has a blank portion between recorded portions

The date search function may not work correctly.

Searching for the date without using cassette memory

- (1) Set the POWER switch to VCR.
- (2) Set CM SEARCH in  to OFF in the menu settings (p. 109). If using a tape without cassette memory, skip this step.
- (3) Press SEARCH MODE on the Remote Commander repeatedly, until the date search indicator appears.
The indicator changes as follows:
INDEX SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN
→ no indicator
- (4) Press  on the Remote Commander to search for the previous date or press  on the Remote Commander to search for the next date. Your camcorder automatically starts playback at the point where the date changes. Each time you press  or , your camcorder searches for the previous or next date.

To stop searching

Press .

Searching for a photo – Photo search/ Photo scan

You can search for a still picture you have recorded on a tape (**photo search**).


You can also search for still pictures one after another and display each picture for five seconds automatically regardless of cassette memory (**photo scan**). Use the Remote Commander for these operations.

Use this function to check or edit still pictures.

Searching for a photo using cassette memory

You can use this function only when playing back a tape with cassette memory (p. 144).



(1) Set the POWER switch to VCR.

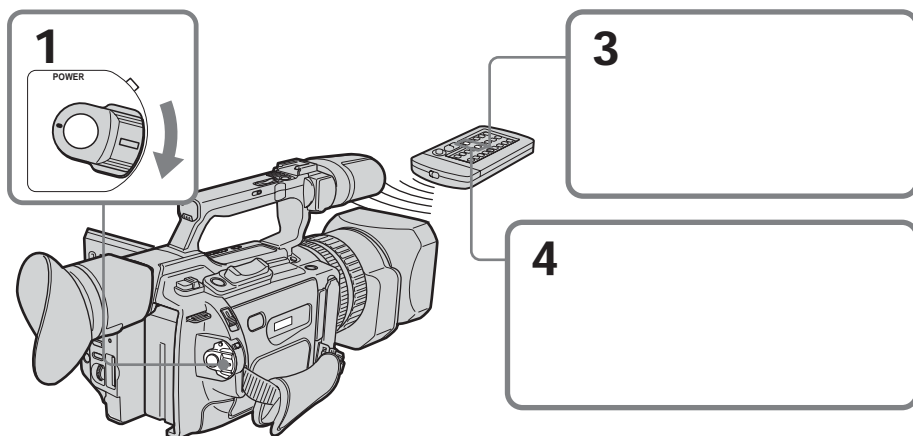
(2) Set CM SEARCH in  to ON in the menu settings (p. 109). Default setting is ON.

(3) Press SEARCH MODE on the Remote Commander repeatedly, until the photo search indicator appears.

The indicator changes as follows:


INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH
→ PHOTO SCAN → no indicator



(4) Press  or  on the Remote Commander to select the date for playback. Your camcorder automatically starts playback of the photo having the date that you selected.



To stop searching

Press .

In the  mark






- The bar in the  mark indicates the present point on the tape.
- The X mark in the  indicates the actual point you are trying to search for.

If a tape has a blank portion between recorded portions

The photo search function may not work correctly.

Searching for a photo – Photo search/Photo scan



Searching for a photo without using cassette memory

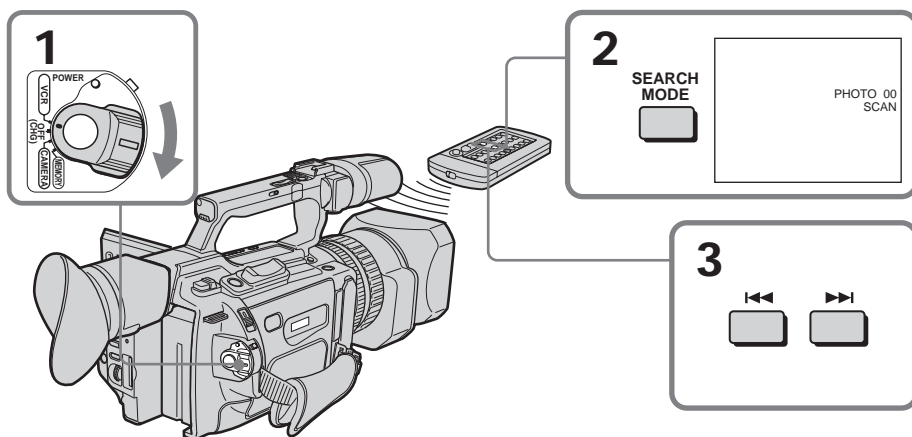
- (1) Set the POWER switch to VCR.
- (2) Set CM SEARCH in  to OFF in the menu settings (p. 109).
- (3) Press SEARCH MODE on the Remote Commander repeatedly, until the photo search indicator appears.
The indicator changes as follows:
INDEX SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN
→ no indicator
- (4) Press  or  on the Remote Commander to select a photo for playback.
Each time you press  or , your camcorder searches for the previous or next photo.
Your camcorder automatically starts playback of the photo.

To stop searching

Press .

Scanning photo

- (1) Set the POWER switch to VCR.
- (2) Press SEARCH MODE on the Remote Commander repeatedly, until the photo scan indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH
→ PHOTO SCAN → no indicator
- (3) Press  or  on the Remote Commander.
Each photo is played back for about five seconds automatically.



To stop scanning

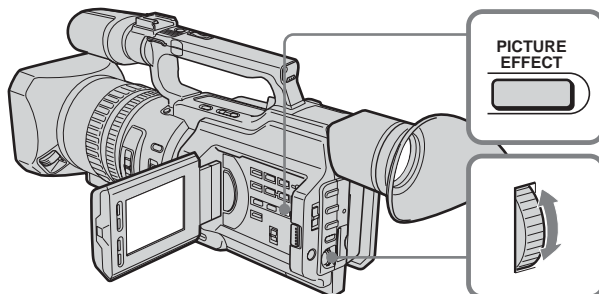
Press .

Playing back a tape with picture effects

During playback, you can process a scene using the picture effect functions: NEG. ART, SEPIA, B&W and SOLARIZE.

In playback or playback pause mode, press PICTURE EFFECT and turn the SEL/PUSH EXEC dial until the desired picture effect indicator (NEG. ART, SEPIA, B&W or SOLARIZE) appears.

For details of each picture effect function, see page 40.




To cancel the picture effect function

Press PICTURE EFFECT so that the indicator disappears.

Notes

- You cannot process a picture using the picture effect function that is input from other equipment.
- To record pictures that you have processed using the picture effect function, record the pictures on the VCR, using your camcorder as a player.

Pictures processed by the picture effect function

Pictures processed by the picture effect function are not output through the  iDV Interface.

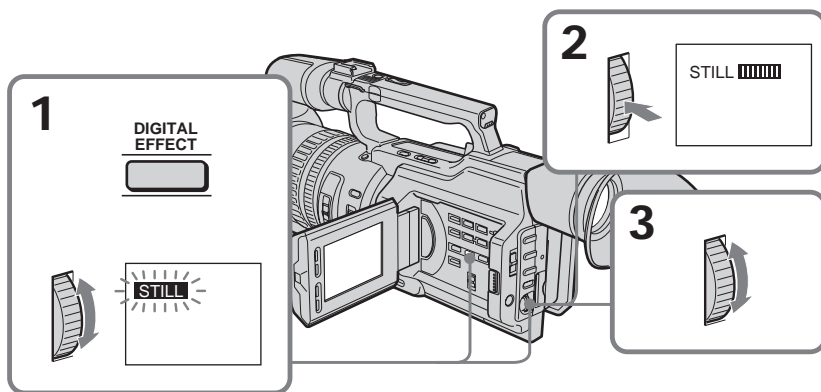
When you set the POWER switch to OFF (CHG) or stop playing back

The picture effect function will be automatically canceled.

Playing back a tape with digital effects

During playback, you can process a scene using the digital effect functions: STILL, FLASH, LUMI. and TRAIL.

- (1) In playback or playback pause mode, press DIGITAL EFFECT and turn the SEL/PUSH EXEC dial until the desired digital effect indicator (STILL, FLASH, LUMI. or TRAIL) flashes.
- (2) Press the SEL/PUSH EXEC dial.
The digital effect indicator lights up and the bars appear. In STILL or LUMI. mode, the picture is captured and is stored in memory as a still picture at the time you press the SEL/PUSH EXEC dial.
- (3) Turn the SEL/PUSH EXEC dial to adjust the effect.
For details of each digital effect function, see page 41.




To cancel the digital effect function

Press DIGITAL EFFECT so that the indicator disappears.

Notes

- You cannot process a picture using the digital effect function that is input from other equipment.
- To record pictures that you have processed using the digital effect function, record the pictures on the VCR, using your camcorder as a player.

Pictures processed by the digital effect function

Pictures processed by the digital effect function are not output through the  DV Interface.

When you set the POWER switch to OFF (CHG) or stop playing back

The digital effect function will be automatically canceled.

Dubbing a tape

Using the A/V connecting cable

Connect your camcorder to the VCR using the A/V connecting cable supplied with your camcorder.


Before a dubbing

Set DISPLAY to LCD in the menu settings. (Default setting is LCD.)

Set the input selector on the VCR to LINE, if available.

- (1) Insert a blank tape (or a tape you want to record over) into the VCR, and insert the recorded tape into your camcorder.
- (2) Set the input selector on the VCR to LINE. For details, refer to the operating instructions of the VCR.
- (3) Set the POWER switch to VCR.
- (4) Play back the recorded tape on your camcorder.
- (5) Start recording on the VCR. For details, refer to the operating instructions of the VCR.

When you have finished dubbing the tape



Press  on both your camcorder and the VCR.

Be sure to clear the indicators from the screen

If they are displayed, press the following buttons so as not to record the indicators on the dubbed tape:

- The DISPLAY button
- The DATA CODE button
- The SEARCH MODE button on the Remote Commander

You can edit on VCRs that support the following systems

 8 mm, 

Dubbing a tape

Connect using an S video cable (optional) to obtain high-quality pictures

With this connection, you do not need to connect the yellow (video) plug of the A/V connecting cable. Connect the S video cable (optional) to the S video jacks on both your camcorder and the TV or the VCR. This connection produces higher quality DV format pictures.

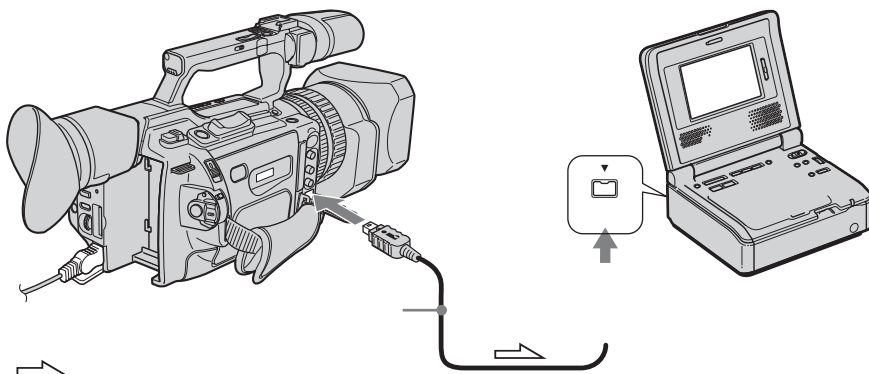
If you use a LANC cable

You can edit precisely by connecting a LANC cable (optional) to this camcorder and other video equipment having a fine synchro-editing function, using this camcorder as a player.

Using an i.LINK cable

Simply connect the i.LINK cable (optional) to **i** DV Interface and to DV Interface of the DV products. With a digital-to-digital connection, video and audio signals are transmitted in digital form for high-quality editing. You cannot dub the titles, display indicators or the contents of cassette memory.

- (1) Insert a blank tape (or a tape you want to record over) into the VCR, and insert the recorded tape into your camcorder.
- (2) Set the input selector on the VCR to the DV input position if the VCR is equipped with an input selector. For details, refer to the operating instructions of the VCR.
- (3) Set the POWER switch to VCR.
- (4) Play back the recorded tape on your camcorder.
- (5) Start recording on the VCR.



When you have finished dubbing a tape

Press **■** on both your camcorder and the VCR.

You can connect one VCR only using the i.LINK cable

Pictures processed by the digital effect or picture effect function

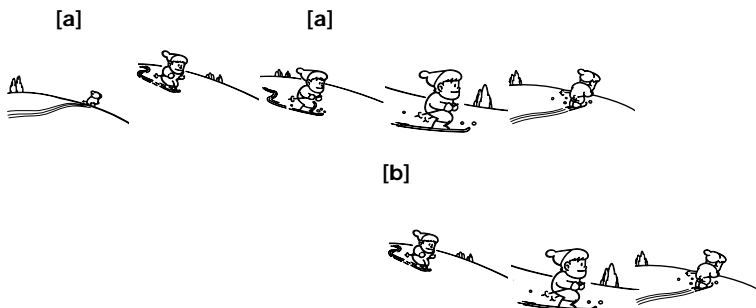
Pictures processed by the digital effect or picture effect function are not output through the **i** DV Interface.

If you record a playback pause picture with the **i** DV Interface

The recorded picture becomes rough. And when you play back the picture using other video equipment, the picture may jitter.

Dubbing only desired scenes – Digital program editing

You can duplicate selected scenes (programs) for editing onto a tape without operating the VCR. Scenes can be selected by frame.



[a] Undesired frame

[b] Moves the scene

Before operating the digital program editing

Preparation 1 Connecting the VCR (p. 74, 75).

Preparation 2 Setting the VCR to operate by infrared rays emitter (p. 77)/Setting the VCR to operate with an i.LINK cable (p. 81).

Preparation 3 Adjusting the synchronization of the VCR (p. 82).


When you dub using the same VCR again, you can skip Preparations 2 and 3.

Using the digital program editing function

Operation 1 Making programs (p. 84).

Operation 2 Performing a digital program editing (Dubbing a tape) (p. 87).

Notes

- You cannot dub the titles, display indicators, or the contents of cassette memory.
- When you connect with an i.LINK cable, you may not be able to operate the dubbing function correctly, depending on the VCR.
Set CONTROL to IR in the menu settings of your camcorder.
- You cannot send the control signal of the digital program editing through the  (LANC) jack.

If you connect using an i.LINK cable

With digital-to-digital connection, video and audio signals are transmitted in digital form for high-quality editing.

Preparation 1: Connecting the VCR

Connect your camcorder and the VCR as shown on pages 74 and 75.
You can use an A/V connecting cable, or an i.LINK cable.

Dubbing only desired scenes – Digital program editing

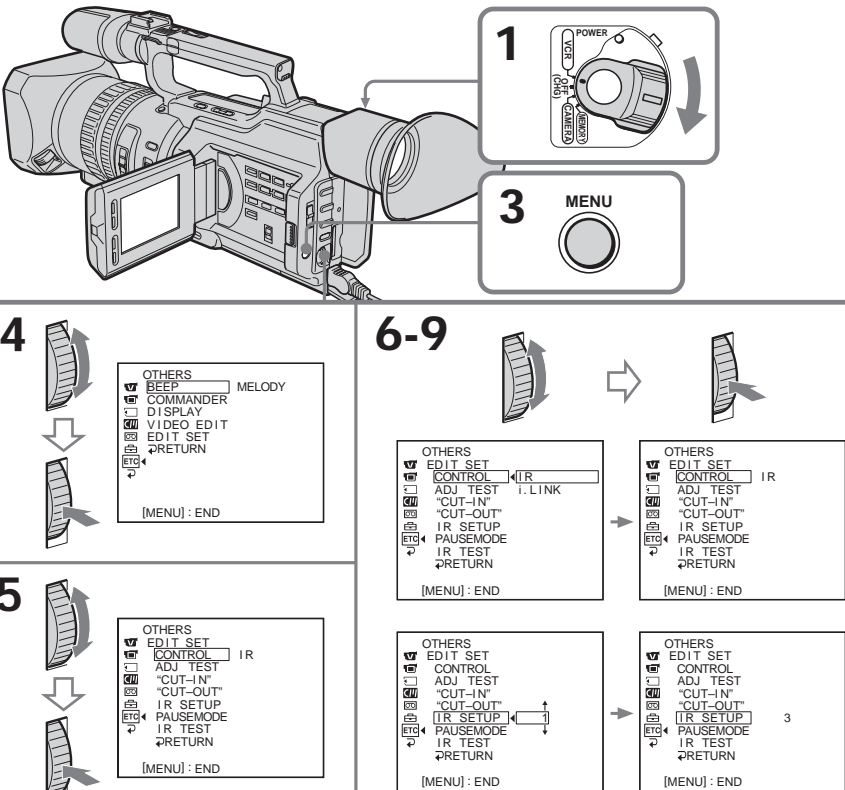
Preparation 2: Setting the VCR to operate by infrared rays emitter

To edit using the VCR, send the control signal by infrared ray to the remote sensor on the VCR. When you connect using the A/V cable, this procedure is required.

- (1) Set the POWER switch to VCR on your camcorder.
- (2) Turn the power of the connected VCR on, then set the input selector to LINE.
When you connect a video camera recorder, set its POWER switch to VCR.
- (3) Press MENU to display the menu.
- (4) Turn the SEL/PUSH EXEC dial to select ETC, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select EDIT SET, then press the dial.
- (6) Turn the SEL/PUSH EXEC dial to select CONTROL, then press the dial.
- (7) Turn the SEL/PUSH EXEC dial to select IR, then press the dial.

Set the IR SETUP code

- (8) Turn the SEL/PUSH EXEC dial to select IR SETUP, then press the dial.
- (9) Turn the SEL/PUSH EXEC dial to select the IR SETUP code of your VCR, then press the dial.
See “About the IR SETUP code ” on the next page.



Dubbing only desired scenes – Digital program editing

About the IR SETUP code

The IR SETUP code is stored in the memory of your camcorder. Be sure to set the correct code, depending on your VCR. Code number 1 is the default setting.

Brand	IR SETUP code
Sony	1, 2, 3, 4, 5, 6
Admiral (M. Wards)	89
Aiwa	47, 54, 80
Akai	49, 51
Audio Dynamic	21, 35
Bell & Howell (M. Wards)	36
Broksonic	21, 70, 82
Canon	77, 78
Citizen	47
Craig	47, 73
Curtis Mathis	8, 77, 80
Daewoo	26, 40, 77
DBX	21, 33, 35
Dimensia	8
Emerson	26, 48, 59, 70, 80, 81, 82
Fisher	36, 37, 44, 45
Funai	80
General Electric	8, 32*, 77, 94*, 101
Goldstar/LG	47
GO VIDEO	71
Hitachi	8, 42, 78
HQ	40
Instant Reply	77, 78
JC Penny	8, 21, 33, 35, 36, 42, 77
JVC	12, 13, 14, 21, 33, 35
Kenwood	21, 33, 35, 47
LXI (Sears)	36, 37, 42, 44, 45, 47, 49, 80
Magnavox	17, 77, 78, 83
Marantz	21, 33, 35
Marta	47
Memorex	37, 77
Minolta	8, 42

Brand	IR SETUP code
Mitsubishi/ MGA	22, 23, 24, 28, 29
Multitech	23, 32, 80
NEC	21, 33, 35
Olympic	77, 87
Optimus	22
Orion	60
Panasonic	16, 17, 77, 78
Pentax	8, 42
Philco	26, 70, 77, 78
Philips	47, 77, 78, 83
Pioneer	78
Quasar	6, 16, 17, 77, 78
RCA/ PROSCAN	7, 8, 16, 40, 41, 42, 77, 78, 78*, 83, 101
Realistic	22, 36, 37, 77, 80, 88
Sansui	21
Singer	73
Samsung	24, 24*, 32, 32*, 41, 94, 94*
Sanyo	26, 36, 37, 47
Scott	22, 23, 24, 28, 32, 37, 40, 41
Sharp	88, 89
Shintom	73
Signature 2000	80, 89
Sylvania	77, 78, 80, 83
Symphonic	80
Tashiro	47
Tatung	21, 33, 35
Teac	21, 33, 35, 80
Technics	77, 78
Toshiba	7, 40, 49
Wards	37, 47, 88, 89, 95
Yamaha	21, 33, 35, 36
Zenith	95

* TV/VCR component

Note on remote control code

You cannot do assemble editing with some VCRs (for recording) if the remote control code does not correspond to this camcorder (for playback).

Dubbing only desired scenes – Digital program editing

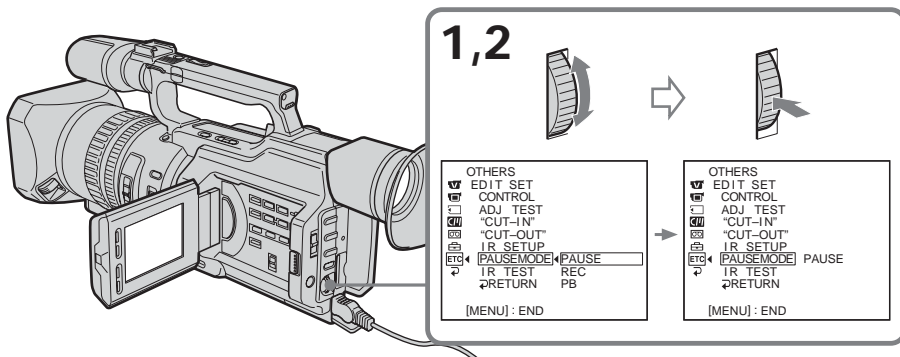
Setting the buttons to cancel the recording pause on the VCR

(1) Turn the SEL/PUSH EXEC dial to select PAUSEMODE, then press the dial.

(2) Turn the SEL/PUSH EXEC dial to select the button to cancel recording pause on the VCR, then press the dial.

The correct button depends on your VCR.

Refer to the operating instructions of your VCR.



The buttons to cancel recording pause on the VCR

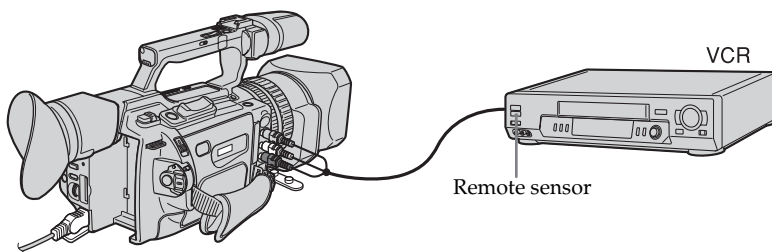
The buttons vary depending on your VCR. To cancel recording pause:

- Select PAUSE if the button to cancel recording pause is **II**.
- Select REC if the button to cancel recording pause is **●**.
- Select PB if the button to cancel recording pause is **▶**.

Setting your camcorder and the VCR to face each other

Locate the infrared ray emitter of your camcorder and face it towards the remote sensor of the VCR.

Set the devices about 30 cm (about 11 7/8 in) apart, and remove any obstacles between the devices.



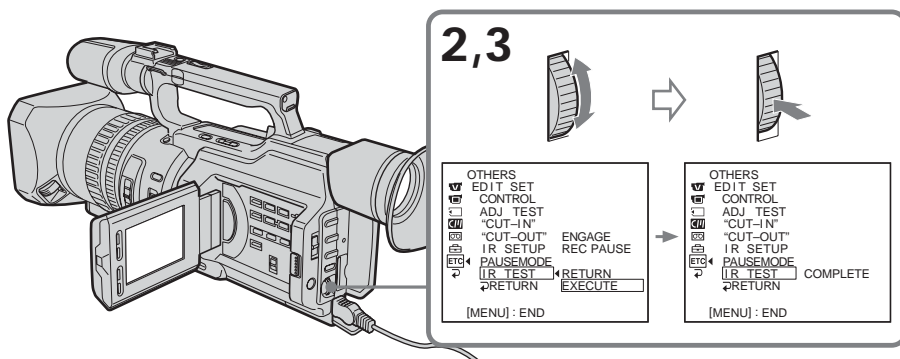
Dubbing only desired scenes – Digital program editing

Confirming the VCR operation

- (1) Insert a recordable tape into the VCR, then set it to recording pause.
- (2) Turn the SEL/PUSH EXEC dial to select IR TEST, then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial.

If the VCR starts recording, the setting is correct.

When finished, the indicator changes to COMPLETE.



When the VCR does not operate correctly

Set the IR SETUP code, or select the button to cancel the recording pause on the VCR.

Dubbing only desired scenes – Digital program editing

Preparation 2: Setting the VCR to operate with an i.LINK cable

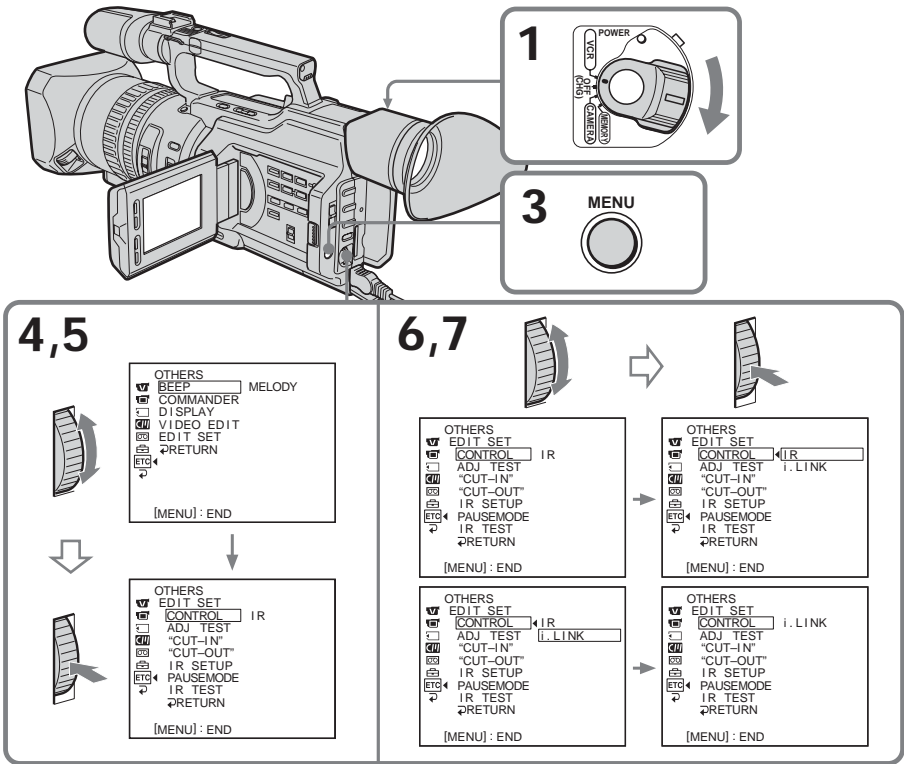
When you connect using an i.LINK cable (optional), follow the procedures below.

- (1) Set the POWER switch to VCR on your camcorder.
- (2) Turn the power of the connected VCR on, then set the input selector to DV input.

When you connect a video camera recorder, set its POWER switch to VCR.

- (3) Press MENU to display the menu.
- (4) Turn the SEL/PUSH EXEC dial to select **ETC**, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select EDIT SET, then press the dial.
- (6) Turn the SEL/PUSH EXEC dial to select CONTROL, then press the dial.
- (7) Turn the SEL/PUSH EXEC dial to select i.LINK, then press the dial.

Editing



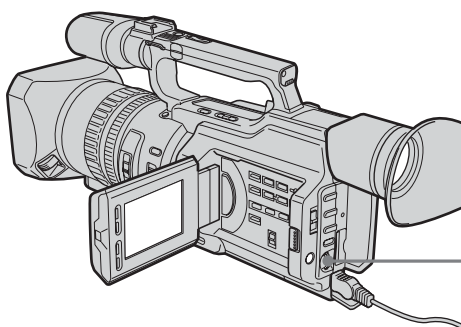
Preparation 3: Adjusting the synchronization of the VCR

You can adjust the synchronization of your camcorder and the VCR.

Remove the cassette from the camcorder beforehand. We recommend that you prepare a pen and paper for notes.

When you connect to a Sony VCR using an i.LINK cable, and have set CONTROL to i.LINK, the setup below is not necessary.

- (1) Insert a recordable tape into the VCR, then set it to recording pause.
When you connect using an i.LINK cable and have set CONTROL to i.LINK, you do not have to turn the recording VCR to recording pause mode.
- (2) Set the POWER switch to VCR.
- (3) Press MENU to display the menu.
- (4) Turn the SEL/PUSH EXEC dial to select **ETC**, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select EDIT SET, then press the dial.
- (6) Turn the SEL/PUSH EXEC dial to select ADJ TEST, then press the dial.
- (7) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial.
CUT-IN and CUT-OUT are recorded on an image for five times each to calculate the numerical values for adjusting the synchronization.
The EXECUTING indicator flashes on the LCD screen or in the viewfinder. When finished, the indicator changes to COMPLETE.
- (8) Rewind the tape in the VCR, then start slow playback.
Take a note of the opening numerical value of each CUT-IN and the closing numerical value of each CUT-OUT.
- (9) Calculate the average of all the opening numerical values of each CUT-IN, and the average of all the closing numerical values of each CUT-OUT.




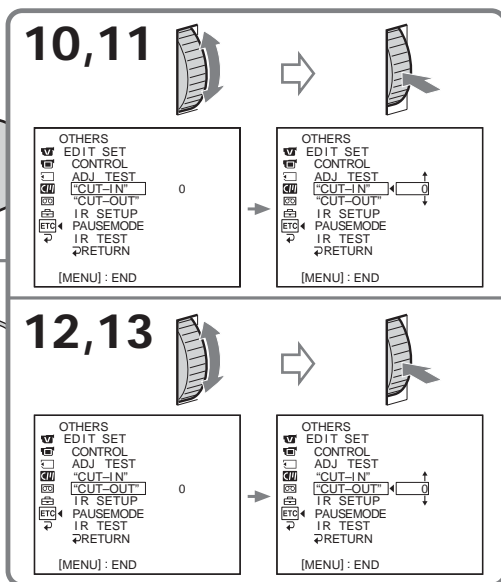
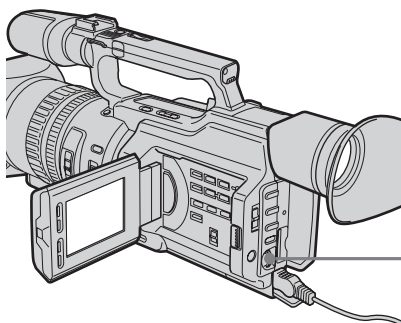
4-6



OTHERS	EDIT SET
CONTROL	
ADJ TEST	RETURN
"CUT-IN"	EXECUTE
"CUT-OUT"	
I.R. SETUP	ENGAGE
PAUSEMODE	REC PAUSE
I.R. TEST	
RETURN	
[MENU] : END	

Dubbing only desired scenes – Digital program editing

- (10) Turn the SEL/PUSH EXEC dial to select “CUT-IN,” then press the dial.
- (11) Turn the SEL/PUSH EXEC dial to select the average numerical value of CUT-IN, then press the dial.
The calculated start position for recording is set.
- (12) Turn the SEL/PUSH EXEC dial to select “CUT-OUT,” then press the dial.
- (13) Turn the SEL/PUSH EXEC dial to select the average numerical value of CUT-OUT, then press the dial.
The calculated stop position for recording is set.
- (14) Turn the SEL/PUSH EXEC dial to select  RETURN, then press the dial.



Editing

Errors in editing

If you connect your camcorder to Sony equipment with the DV jack, the range of errors is within ± 5 frames.

The range may become wider in the following conditions:

- The interval between CUT-IN and CUT-OUT is less than five seconds (p. 84).
- CUT-IN or CUT-OUT is set at the beginning of the tape.

When “ENGAGE REC PAUSE” appears on the LCD screen or in the viewfinder

Turn the recording VCR to recording pause mode.

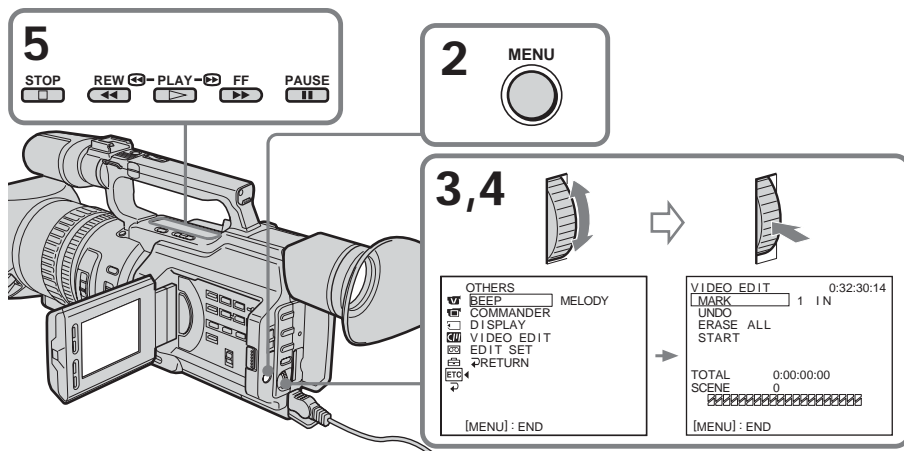
Note

If you start recording from the very beginning of the tape, the first few seconds of the tape may not record properly. Be sure to allow about 10 seconds' lead before starting the recording.

Make sure the IR SETUP code is correct; reset if necessary.

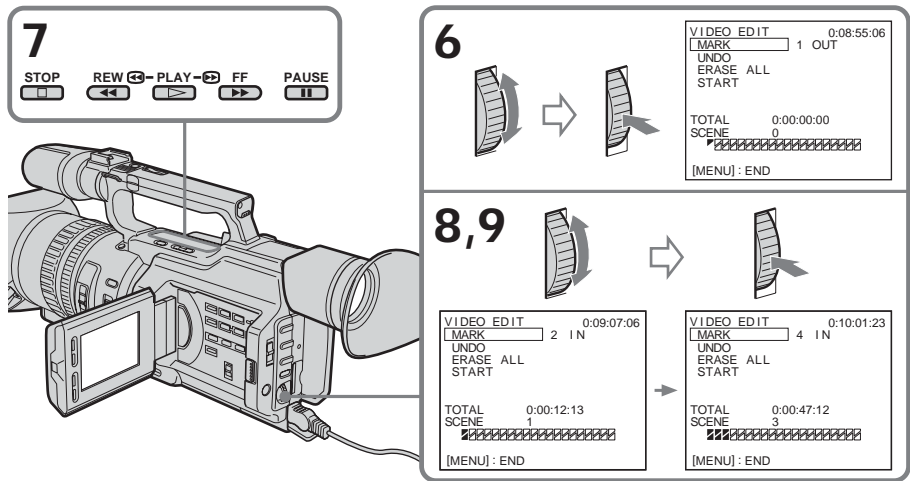
Keep the i.LINK connection, and carry out Preparation 2 (p. 77) again. The audio and video signals are sent as digital signals.

- (1) Insert the tape for playback into your camcorder, and insert a tape for recording into the VCR.
- (2) Press MENU to display the menu.
- (3) Turn the SEL/PUSH EXEC dial to select ETC, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select VIDEO EDIT, then press the dial.
- (5) Search for the beginning of the first scene you want to insert using the video control buttons, then pause playback (p. 30).



Dubbing only desired scenes – Digital program editing

- (6) Press the SEL/PUSH EXEC dial, or MARK on the Remote Commander.
The CUT-IN point of the first program is set, and the top part of the program mark changes to light blue.
- (7) Search for the end of the first scene you want to insert using the video operating buttons, then pause playback (p. 30).
- (8) Press the SEL/PUSH EXEC dial, or MARK on the Remote Commander.
The CUT-OUT point of the first program is set, then the bottom part of the program mark changes to light blue.
- (9) Repeat steps 5 to 8, then set the program.
When the program is set, the program mark changes to light blue.
You can set a maximum of 20 programs.



Editing

On a blank portion of the tape

You cannot set CUT-IN or CUT-OUT on a blank portion of the tape.

Note

The total time of the programs is indicated on the LCD screen or in the viewfinder, however, if the time code on the tape is not continuous, the time may not be indicated properly.

Erasing the last program

To change the end of the last program, delete the CUT-OUT mark.

To erase the whole program, delete both the CUT-IN and CUT-OUT marks.

- (1) Turn the SEL/PUSH EXEC dial to select UNDO, then press the dial. The last set program mark flashes.
- (2) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial and the setting is canceled.

To cancel erasing

Select RETURN in step 2, then press the SEL/PUSH EXEC dial.

Erasing all programs

- (1) Select VIDEO EDIT in the menu settings. Turn the SEL/PUSH EXEC dial to select ERASE ALL, then press the dial. All the program marks flash.
- (2) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial and the settings are canceled.

To cancel erasing all programs

Select RETURN in step 2, then press the SEL/PUSH EXEC dial.

To cancel a program you have set

Press MENU.

The program is stored in memory until the tape is ejected.

Operation 2: Performing a digital program editing (Dubbing a tape)

Make sure your camcorder and VCR are connected, and that the VCR is set to recording pause. When you use an i.LINK cable, you do not have to set the VCR to recording pause.

When you use a video camera recorder, set its POWER switch to VCR.

- (1) Select VIDEO EDIT. Turn the SEL/PUSH EXEC dial to select START, then press the dial.
- (2) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial.
The camcorder automatically searches for the beginning of the first program, then starts dubbing.
The EXECUTING indicator flashes.
The SEARCH indicator appears during search, and the EDIT indicator appears during edit on the LCD screen or in the viewfinder.
The program marks light up after dubbing is complete.
When the dubbing ends, your camcorder and the VCR automatically stop.

To stop dubbing

Press ■ on this camcorder or on the Remote Commander.

To end the digital program editing function

Your camcorder stops when the dubbing is complete. Then the display returns to VIDEO EDIT in the menu settings.

Press MENU to end the digital program editing function.

When the operations of the VCR do not work with an i.LINK cable

Keep the i.LINK connection, and carry out Preparation 2 (p. 77) again.

You cannot record on the VCR when:

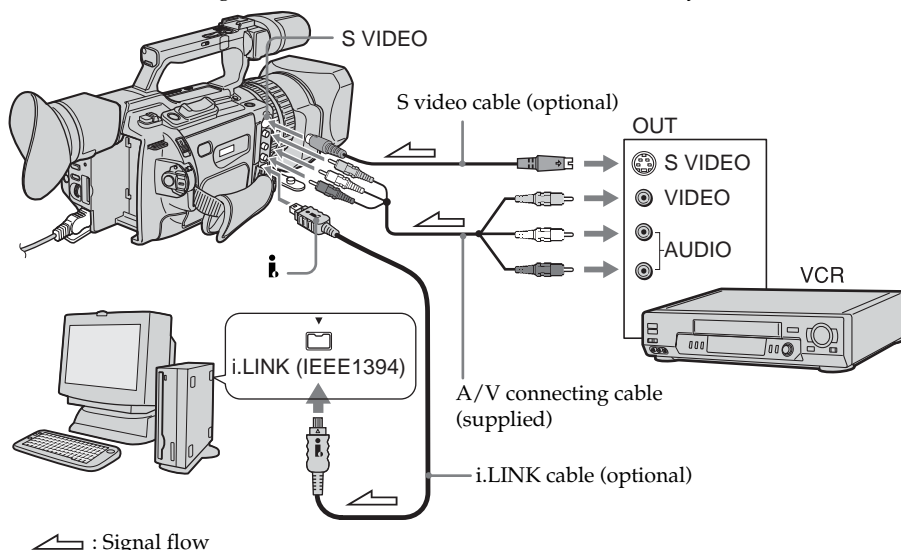
- The cassette is not inserted.
- The tape has run out.
- The write-protect tab is set to the protect position.
- The IR SETUP code is not correct. (When IR is selected.)
- The setup to cancel recording pause is not correct (p. 79). (When IR is selected.)


NOT READY appears on the LCD screen when:

- The program to operate the digital program edit has not been made.
- i.LINK is selected but an i.LINK cable is not connected. (When i.LINK is selected.)
- The power of the connected VCR is not turned on.

Using with an analog video unit and a PC – Signal convert function

You can convert the analog input signal to the digital signal and output it from the DV Interface on this camcorder. You can capture images and sound from an analog video unit connecting a PC which has i.LINK (IEEE1394) connector to your camcorder.



- (1) Set the POWER switch to VCR.
- (2) Press MENU to display the menu.
- (3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select A/V → DV OUT, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
- (6) Press MENU to erase the menu display.
- (7) Start playback on the analog video unit slightly ahead of the point from which you want to start capturing images.
- (8) Start capturing procedures on your PC. The operation procedures depend on your PC and the software which you use.
For details on how to capture images, refer to the instruction manual of your PC and your software.

After capturing images and sound

Stop capturing procedures on your PC, and stop the playback on the analog video unit.

Notes

- When you edit the captured image and sound from the analog video unit by a PC, you need to install an appropriate software which can exchange video signals between the camcorder and a PC.
- Depending on the condition of the analog video signals, the PC may not be able to output the images correctly when you convert analog video signals into digital video signals via your camcorder. Depending on the analog video unit, the image may contain noise or incorrect colors.
- The camcorder cannot output the digital signal when you input the analog signal that includes a copyright protection signal.

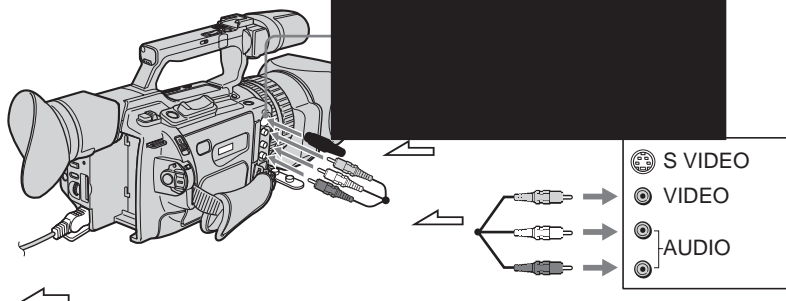
Recording video

Using the A/V connector

You can record a tape from a TV that has video/

audio outputs. Use your

- (1) Insert a blank tape into your camcorder. If you want to record a TV program, insert the tape into the VCR.
- (2) Set the POWER switch to VCR.
- (3) Set DISPLAY in [TV].
- (4) Press MENU to enter the menu.
- (5) Press ● REC and the camcorder will start recording. If you want to start recording from a VCR, select a TV program if you want to record a TV or VCR appears on the LCD screen.
- (7) Press ■ on your camcorder to stop recording.



When you have finished recording

Press ■ on both your camcorder and the VCR.

Using the Remote Commander

In step 5, press ● REC and MARK simultaneously, then immediately press ■. And in step 7, press ■ at the scene from which you want to start recording.

Recording video or TV programs

If your VCR is a monaural type

Connect the yellow plug of the A/V connecting cable to the video output jack and the white plug to the audio output jack on the VCR or the TV. The red plugs are not used.

Connect using an S video cable (optional) to obtain high-quality pictures

With this connection, you do not need to connect the yellow (video) plug of the A/V connecting cable.

Connect an S video cable (optional) to the S video jacks of both your camcorder and the VCR.

This connection produces higher quality DV format pictures.

If you do various playbacks on the VCR during recording

The recorded picture may be blurred.

On the commander mode

Your camcorder works in the commander mode, VTR 2. Commander modes 1, 2 and 3 are used to distinguish your camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR in the commander mode VTR 2, we recommend changing the commander mode or covering the sensor of the VCR with black paper.

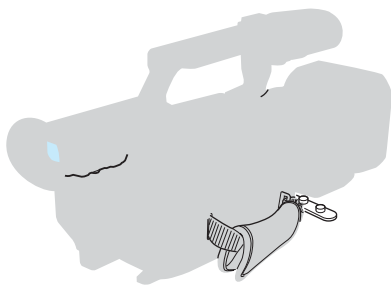
On index signal

The index is automatically marked on a tape when you start recording. If you mark the index using the INDEX MARK button during recording, "LINE" appears in the CH column on the INDEX SEARCH screen, and the index is recorded on cassette memory.

Using an i.LINK cable

Simply connect the i.LINK cable (optional) to **i** DV Interface and to DV Interface of the DV products. With digital-to-digital connection, video and audio signals are transmitted in digital form for high-quality editing.

- (1) Insert a blank tape (or a tape you want to record over) into your camcorder, and insert the recorded tape into the VCR.
- (2) Set the POWER switch to VCR on your camcorder.
- (3) Set DISPLAY in **ETC** to LCD in the menu settings (p. 109).
- (4) Press MENU to erase the menu display.
- (5) Press **●** REC and the button on its right simultaneously on your camcorder, then immediately press **II** on your camcorder.
- (6) Press **▶** on the VCR to start playback. The picture to be recorded appears on the LCD screen or in the viewfinder.
- (7) Press **II** on your camcorder at the scene from which you want to start recording.



When you have finished recording

Press **■** on both your camcorder and the VCR.

Using the Remote Commander

In step 5, press **●** REC and MARK simultaneously, then immediately press **II**. And in step 7, press **II** at the scene from which you want to start recording.

Recording video or TV programs

You can connect only one VCR using the i.LINK cable

When you dub a picture in digital form

The color of the display may be uneven. However this does not affect the dubbed picture.

If you record a still picture in playback pause mode via the i DV Interface

The recorded picture becomes rough. And when you play back the picture using your camcorder, the picture may jitter.

Before recording

Press DISPLAY and make sure that the DV IN indicator appears on the LCD screen or in the viewfinder. The DV IN indicator may appear on both pieces of equipment.

On the commander mode

Your camcorder works in the commander mode, VTR 2. Commander modes 1, 2 and 3 are used to distinguish your camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR in the commander mode VTR 2, we recommend changing the commander mode or covering the sensor of the VCR with black paper.

Editing

[C]: The tape after editing

- (1) Set the POWER switch to VCR on your camcorder.
- (2) On the VCR, locate a point just before the insert start point [a], then press **II** to set the VCR to the playback pause mode.
- (3) On your camcorder, locate the insert end point [c] by pressing **◀◀** or **▶▶**. Then press **II** to set it to the playback pause mode.
- (4) Press ZERO SET MEMORY on the Remote Commander. The ZERO SET MEMORY indicator flashes and the end point of the insert is stored in memory. The tape counter shows "0:00:00." If the tape counter does not appear, press DISPLAY.
- (5) On your camcorder, locate the insert start point [b] by pressing **◀◀**, then press **● REC** and the button on its right simultaneously, then immediately press **II** on your camcorder.
- (6) First press **II** on the VCR, and after a few seconds press **II** on your camcorder to start inserting the new scene.
Inserting automatically stops near the zero point on the tape counter. Your camcorder automatically returns to the recording pause mode.



Inserting a scene from a VCR – Insert editing

To change the insert end point

Press ZERO SET MEMORY on the Remote Commander again after step 5 to erase the ZERO SET MEMORY indicator and begin from step 3.

Using the Remote Commander

In step 5, press ●REC and MARK simultaneously, then immediately press ■■. And in step 6, press ■■ at the scene from which you want to start recording.

Note

The picture and sound recorded on the portion between the insert start and end points will be erased when you insert the new scene.

If you insert scenes on the tape recorded with an other camcorder (including an other DCR-VX2100)

The picture and sound may be distorted. We recommend that you insert scenes on a tape recorded with your camcorder.

When the inserted picture is played back

The picture and sound may be distorted at the end of the inserted portion. This is not a malfunction.

The picture and sound at the start point and the end point may be distorted in the LP mode.

To insert a scene without setting the insert end point

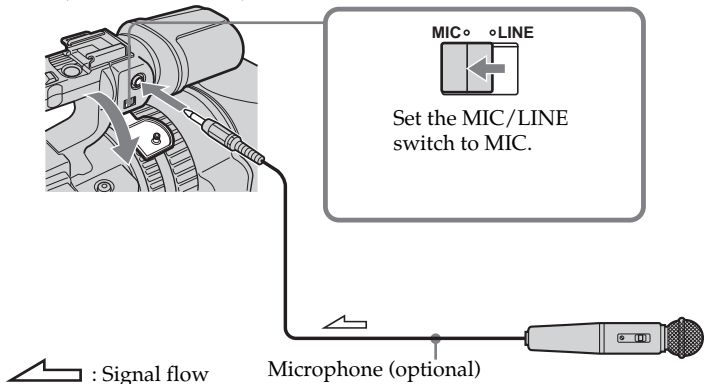
Skip steps 3 and 4. Press ■ when you want to stop inserting.

Audio dubbing

You can record an audio sound to add to the original sound on a tape by connecting audio equipment or a microphone. If you connect audio equipment, you can add sound to your recorded tape by specifying the starting and ending points. The original sound will not be erased. You can also use the Remote Commander for this operation.

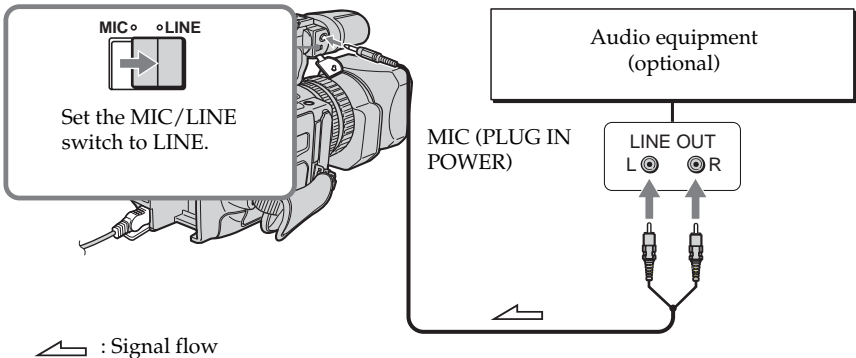
Connecting the microphone with the MIC jack

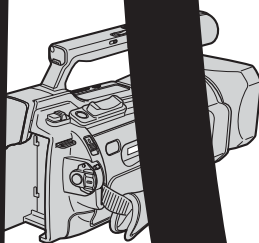
MIC (PLUG IN POWER)



You can check the picture on TV by connecting with the video jack. You cannot monitor the additional sound by the speaker. Use the headphone jack.

Connecting the audio equipment with the MIC jack

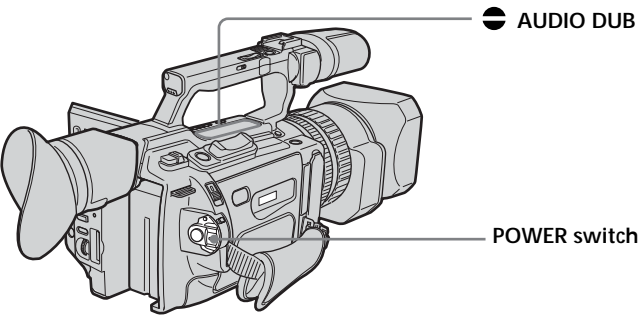




Audio dubbing

Adding an audio sound on a recorded tape

- (1) Insert the recorded tape into your camcorder.
- (2) Set the POWER switch to VCR on your camcorder.
- (3) Locate the recording start point by pressing ►. Then press || at the point where you want to start recording to set your camcorder to the playback pause mode.
- (4) Press ● AUDIO DUB. The green ● || indicator appears on the LCD screen or in the viewfinder.
- (5) Press || and start playing back the audio you want to record at the same time. The new sound is recorded in stereo 2 (ST2) during playback.
- (6) Press ■ at the point where you want to stop recording.

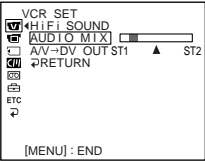


Editing

Monitoring the new recorded sound


To play back the sound

Adjust the balance between the original sound (ST1) and the new sound (ST2) by selecting AUDIO MIX in the menu settings (p. 109).



If you wait five minutes after you disconnect the power source or remove the battery pack, the setting of AUDIO MIX returns to the original sound (ST1) only. The default setting is for original sound only.

Notes

- New sound cannot be recorded on a tape already recorded in the 16-bit mode (p. 113).
- New sound cannot be recorded on a tape already recorded in the LP mode.
- You cannot add audio with the  DV Interface.

If you make all the connections

The audio input to be recorded will take precedence over others in the following order.

- MIC (PLUG IN POWER) jack
- Intelligent accessory shoe
- AUDIO L/R jacks
- Built-in microphone

If an i.LINK cable (optional) is connected to your camcorder

You cannot add sound to a recorded tape.

If you set the write-protect tab of the tape to lock

You cannot record on the tape. Slide the write-protect tab to release the write protection.

We recommend that you add new sound on a tape recorded with your camcorder

If you add new sound on a tape recorded with another camcorder (including an other DCR-VX2100), the sound quality may deteriorate.

To add new sound more precisely

Press ZERO SET MEMORY on the Remote Commander at the point where you want to stop recording later in playback mode. Then, follow the procedure from step 3.

Recording automatically stops at the point where ZERO SET MEMORY was pressed.

On blank portions

You cannot add an audio.

You can adjust the recording level manually using the recording adjustment display in the following cases:

- Dubbing with an optional external microphone or audio equipment through the MIC jack
- Dubbing with an optional external microphone installed into the intelligent accessory shoe.
- Dubbing with the internal microphone

Superimposing a title


CM
only

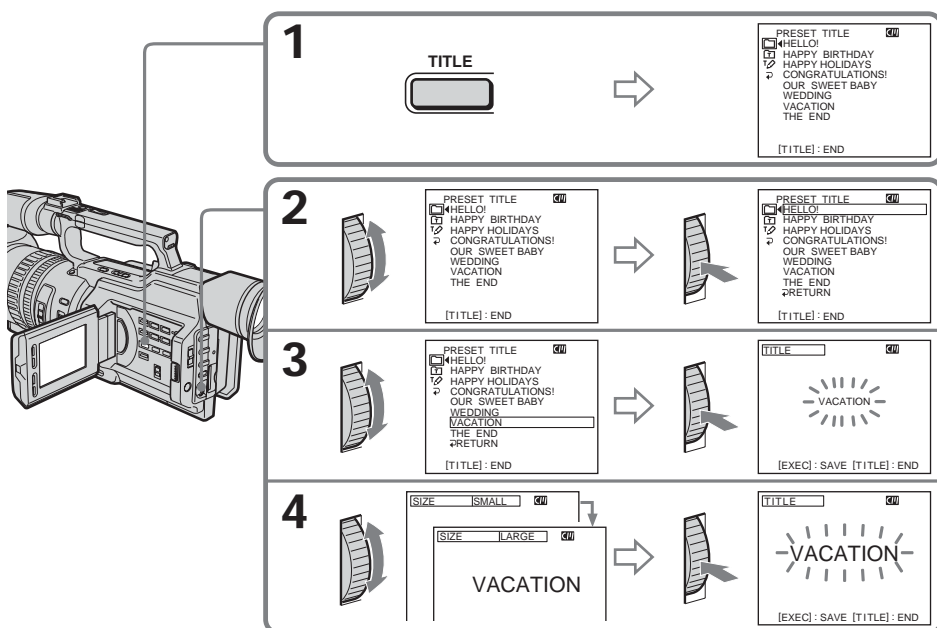
If you use a tape with cassette memory, you can superimpose the title while recording or after recording. When you play back the tape, the title is displayed for five seconds from the point where you superimposed it.

You can select one of eight preset titles and two custom titles (p. 103).



You can also select the color, size and position of titles.

- (1) Press TITLE to display the title menu in standby, recording, playback, or playback pause mode.
- (2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select the desired title, then press the dial. The title flashes.
- (4) Change the color, size, or position, if necessary.
 - ① Turn the SEL/PUSH EXEC dial to select the COLOR, SIZE, or POSITION, then press the dial. The item appears.
 - ② Turn the SEL/PUSH EXEC dial to select the desired item, then press the dial.
 - ③ Repeat steps 1 and 2 until the title is laid out as desired.



Superimposing a title

(5) Press the SEL/PUSH EXEC dial again to complete the setting.

In playback, playback pause, or recording mode:

The “TITLE SAVE” indicator appears on the screen for five seconds and the title is set.


In standby mode:

The “TITLE” indicator appears. When you press START/STOP to start recording, “TITLE SAVE” appears on the screen for five seconds and the title is set.

If you set the write-protect tab to lock

You cannot superimpose or erase the title. Slide the write-protect tab to release the write protection.

To use a custom title

If you want to use the custom title, select  in step 2.

If the tape has a blank portion

You cannot superimpose a title on that portion.

If the tape has a blank portion in the middle of the recorded parts

The title may not be displayed correctly.

The titles superimposed with your camcorder

- They are displayed only on the DV ^{Mini} **DV** format video equipment with the index titler function.
- The point you superimposed the title may be detected as an index signal when searching a recording with other video equipment.

To not display titles

Set TITLE DSPL to OFF in the menu settings (p. 109).

Superimposing a title

Title setting


- The title color changes as follows:
WHITE ↔ YELLOW ↔ VIOLET ↔ RED ↔ CYAN ↔ GREEN ↔ BLUE
- The title size changes as follows:
SMALL ↔ LARGE
You cannot input more than 12 characters in LARGE size.
- If you select the title size "SMALL," you have nine choices for the title position.
If you select the title size "LARGE," you have eight choices for the title position.

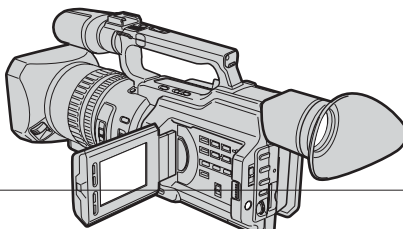
If the " FULL" mark appears

The cassette memory is full. If you erase the title, index data, date data, photo data, or cassette label in the cassette, you can then superimpose a title.

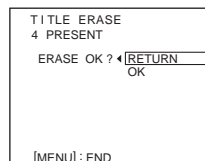
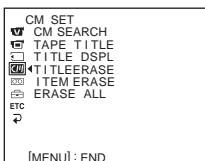
Erasing a title

Erasing a title

- (1) Set the POWER switch to VCR or CAMERA.
- (2) Press MENU to display the menu.
- (3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select TITLEERASE, then press the dial.
The title erase display appears.
- (5) Turn the SEL/PUSH EXEC dial to select the title you want to erase, then press the dial.
The "ERASE OK ?" indicator appears.
- (6) Make sure the title is the one you want to erase, and turn the SEL/PUSH EXEC dial to select OK, then press the dial.
"OK" changes to "EXECUTE."
- (7) Press the SEL/PUSH EXEC dial.
"ERASING" flashes for about two seconds and "COMPLETE" appears after erasing the title.



3-5



To cancel erasing

Select RETURN in step 6 or 7, then press the SEL/PUSH EXEC dial.


To erase all the titles

See "Erasing the cassette memory data" on page 107.

Making your own titles

CM
only


You can make up to two titles and store them in cassette memory. Each title can have up to 20 characters.

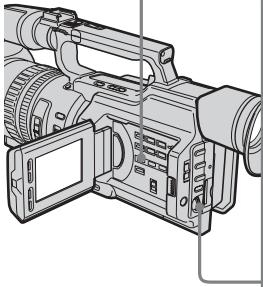
- (1) Press TITLE in the standby, playback, or playback pause mode.
- (2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (3) Turn the SEL/PUSH EXEC dial to select CUSTOM1 SET or CUSTOM2 SET, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select the column of the desired character, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select the desired character, then press the dial.
- (6) Repeat steps 4 and 5 until you have selected all characters and completed the title.
- (7) To finish making your own titles, turn the SEL/PUSH EXEC dial to select [SET], then press the dial. The title is stored in memory.
- (8) Press TITLE to erase the title menu display.

Editing


1

TITLE






2




TITLE SET CM
 CUSTOM1 SET
 CUSTOM2 SET
 [RETURN]




[TITLE] : END

3




TITLE SET CM
 CUSTOM1 SET
 CUSTOM2 SET
 [RETURN]




[TITLE] : END


4-6



TITLE SET CM


 ABCDE 12345
 FGHIJ 67890
 KLMNO . . /-
 [PQRST] [+]
 UVWXY [SET]
 Z& ?!
 [TITLE] : END





TITLE SET CM

 ABCDE 12345
 FGHIJ 67890
 KLMNO . . /-
 [PQRST] [+]
 UVWXY [SET]
 Z& ?!
 [TITLE] : END



103

Making your own titles

To change a title you have stored

In step 3, select CUSTOM1 SET or CUSTOM2 SET, depending on which title you want to change, then press the SEL/PUSH EXEC dial. Turn the SEL/PUSH EXEC dial to select [←], then press the dial to delete the title. The last character is erased. Enter a new title as desired.

If you take five minutes or longer to enter characters in standby mode while a cassette is in your camcorder, the power automatically goes off

The characters you have entered remain stored in memory. Set the POWER switch to OFF (CHG) once and then follow the procedure from step 7 again.

We recommend setting the operation in playback or playback pause mode or removing the cassette so that your camcorder does not automatically turn off while you are entering title characters.

To erase a character

Turn the SEL/PUSH EXEC dial to select [←], then press the dial. The last character is erased.

To enter a space

Select [Z & ? !], then select the blank part.

a cassette. The label can
memory. When you insert
, CAMERA, or
s.

the dial.
then press the dial. The
the desired character,
acter, then press the
the dial.

Editing



4,5



12345 67890 [+] [SET]	END
12345 67890 [+] [SET]	END

Labeling a cassette

To change the label you have made

Insert the cassette to change the label, and operate in the same way as you do to make a new label.

If you set the write-protect tab of the tape to lock

You cannot label the tape. Slide the write-protect tab to release the write protection.

If you have superimposed titles in the cassette

When the label is displayed, up to four titles also appear.

When the "-----" indicator has fewer than 10 spaces

The cassette memory is full.

The "-----" indicates the number of characters you can select for the label.

To erase a character

Turn the SEL/PUSH EXEC dial to select [←], then press the dial. The last character is erased.

To enter a space

Select [Z& ? !], then select the blank part.

Erasing the cassette memory data

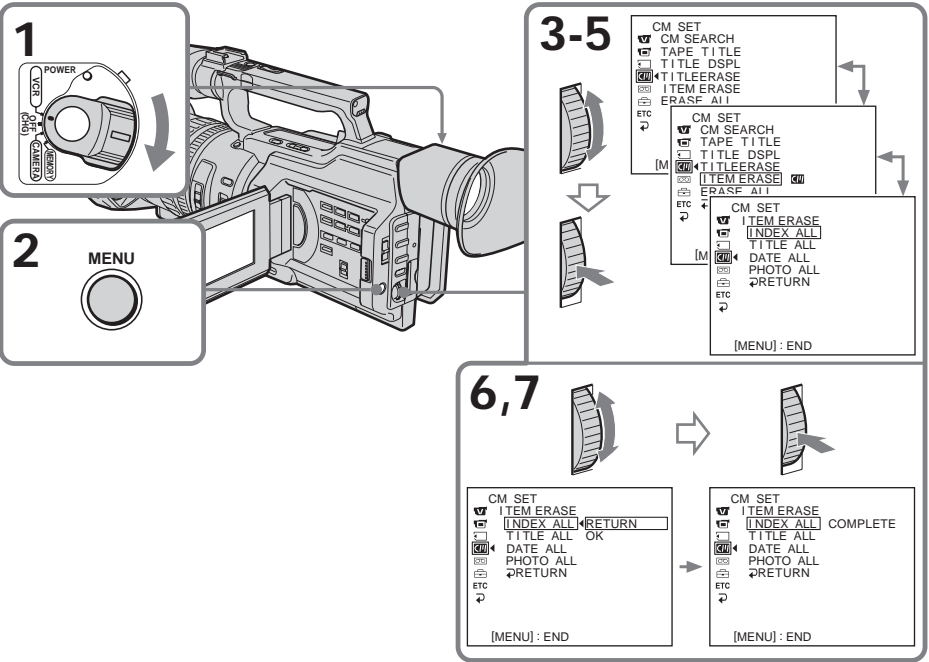
You can erase data stored in cassette memory, each item's data can be erased separately.
You can also erase all items' data once.

Erasing each item's data separately

- (1) Set the POWER switch to VCR or CAMERA.
- (2) Press MENU to display the menu display.
- (3) Turn the SEL/PUSH EXEC dial to select **[CM]**, then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select ITEM ERASE, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select the item that you want to erase its data, then press the dial.

Item	Meaning
INDEX ALL	Erases all the index data.
TITLE ALL	Erases all the title data.
DATE ALL	Erases all the date data.
PHOTO ALL	Erases all the photo data.

- (6) Turn the SEL/PUSH EXEC dial to select OK, then press the dial. "OK" changes to "EXECUTE."
- (7) Press the SEL/PUSH EXEC dial.
"ERASING" flashes for about two seconds and "COMPLETE" appears after erasing the selected item's data.




To cancel erasing

Select RETURN in step 6 or 7, then press the SEL/PUSH EXEC dial.

Erasing the cassette memory data

Erasing all the data in cassette memory

- (1) Set the POWER switch to VCR or CAMERA.
- (2) Press MENU to display the menu display.
- (3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select ERASE ALL, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select OK, then press the dial. "OK" changes to "EXECUTE."
- (6) Press the SEL/PUSH EXEC dial.
"ERASING" flashes for about two seconds and "COMPLETE" appears after erasing all the data.

To cancel erasing

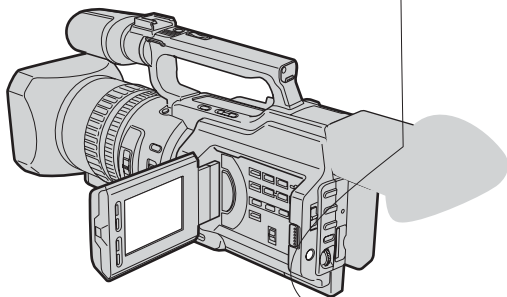
Select RETURN in step 5 or 6, then press the SEL/PUSH EXEC dial.

Changing the menu settings

To change the mode settings in the menu settings, select the menu items with the SEL/PUSH EXEC dial. The default settings can be partially changed. First, select the icon, then the menu item and then the mode.

- (1) In standby, or when the POWER switch is set to VCR or MEMORY, press MENU.
- (2) Turn the SEL/PUSH EXEC dial to select the desired icon, then press the dial to set it.
- (3) Turn the SEL/PUSH EXEC dial to select the desired item, then press the dial to set it.
- (4) Turn the SEL/PUSH EXEC dial to select the desired mode, then press the dial to set it.
- (5) If you want to change other items, select ↩ RETURN and press the dial, then repeat steps 2 to 4.

For details, see “Selecting the mode setting of each item” (p. 110).



Changing the menu settings

To make the menu display disappear

Press MENU.



Menu items are displayed as the following icons:

-  MANUAL SET
-  CAMERA SET
-  VCR SET
-  LCD/VF SET
-  MEMORY SET
-  CM SET
-  TAPE SET
-  SETUP MENU
-  OTHERS

Selecting the mode setting of each item ● is the default setting.

Menu items differ depending on the position of the POWER switch.

The LCD screen or viewfinder screen shows only the items you can operate at the moment.

Icon/item	Mode	Meaning	POWER switch
 AUTO SHTR	● ON	To automatically adjust the electronic shutter* speed.	CAMERA MEMORY
	OFF	To fix the electronic shutter* speed.	
PROG. SCAN	● OFF	Records still/moving pictures in the interlace format.	CAMERA
	ON	Records still/moving pictures in progressive recording mode.	
 D ZOOM	● OFF	To deactivate the digital zoom. Up to 12× zoom is carried out.	CAMERA
	24×	To activate the digital zoom. More than 12× zoom is performed digitally. This value goes up to 24× (p. 22).	
	48×	To activate the digital zoom. More than 12× zoom is performed digitally. This value goes up to 48× (p. 22).	
16:9WIDE	● OFF	To not record a 16:9 wide picture.	CAMERA
	ON	To record a 16:9 wide picture (p. 36).	
STEADYSHOT	● ON	To compensate for camera-shake.	CAMERA MEMORY
	OFF	To cancel the SteadyShot function. Natural pictures are produced when shooting a stationary object with a tripod.	


*About the electronic shutter

The electronic shutter is the function used to adjust the shutter speed electrically.



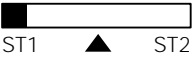


Notes on the SteadyShot function

- The SteadyShot function will not correct excessive camera-shake.
- Attachment of a conversion lens (optional) may influence the SteadyShot function.

If you cancel the SteadyShot function

The SteadyShot OFF indicator  appears. Your camcorder prevents excessive compensation for camera-shake.

Changing the menu settings

Icon/item	Mode	Meaning	POWER switch
 FRAME REC	● OFF	Does not make a cut recording.	CAMERA
	ON	Makes a cut recording (p. 62).	
INT. REC	ON	Makes an interval recording (p. 60).	CAMERA
	● OFF	Does not make an interval recording.	
	SET	Sets the interval time and recording time.	
 HiFi SOUND	● STEREO	To play back a stereo tape or dual sound track tape with main and sub sound (p. 145).	VCR
	1	To play back a stereo tape with the left sound or a dual sound tape with main sound.	
	2	To play back a stereo tape with the right sound or a dual sound track tape with sub sound.	
AUDIO MIX	—	To adjust the balance between the stereo 1 and stereo 2 (p. 97).	VCR
			
A/V→DV OUT	● OFF	To output analog images in digital format using your camcorder.	VCR
	ON	To output digital images in analog format using your camcorder.	
 LCD B. L.	● BRT NORMAL	To set the brightness on the LCD screen to normal.	VCR CAMERA
	BRIGHT	To brighten the LCD screen.	MEMORY
LCD COLOR	—	To adjust the color on the LCD screen with the SEL/PUSH EXEC dial.	VCR CAMERA MEMORY
			
VF B.L.	● BRT NORMAL	To set the brightness on the viewfinder screen to normal.	VCR CAMERA
	BRIGHT	To brighten the viewfinder screen.	MEMORY
GUIDEFAME	● OFF	Does not display the guide frame.	CAMERA
	ON	Displays the guide frame (p. 35).	MEMORY

Notes on LCD B.L. and VF B.L.

- When you select “BRIGHT,” battery life is reduced a little during recording.
- When you use power sources other than the battery pack, “BRIGHT” is automatically selected.

Customizing Your Camcorder

Changing the menu settings

Icon/item	Mode	Meaning	POWER switch
CONTINUOUS	● OFF	Not to record continuously.	MEMORY
	ON	To record four images continuously (p. 122).	
	MULTI SCRN	To record nine images continuously (p. 122).	
QUALITY	● SUPER FINE (SFN)	To record still images in the super fine image quality mode, using a "Memory Stick" (p. 119).	VCR MEMORY
	FINE (FINE)	To record still images in the fine image quality mode, using a "Memory Stick" (p. 119).	
	STANDARD (STD)	To record still images in the standard image quality mode, using a "Memory Stick" (p. 119).	
PRINT MARK	● OFF	To erase print marks on still images.	VCR
	ON	To write a print mark on the recorded still images you want to print out later.	MEMORY
PROTECT	● OFF	To release protection from still images.	VCR
	ON	To protect selected still images against accidental erasure (p. 139).	MEMORY
SLIDE SHOW		To play back all the images as a slide show (p. 138).	MEMORY
DELETE ALL		To delete all unprotected images (p. 141).	MEMORY
FORMAT	● RETURN	To cancel formatting.	MEMORY
	OK	To format an inserted "Memory Stick." 1. Select FORMAT with the SEL/PUSH EXEC dial, then press the dial. 2. Turn the SEL/PUSH EXEC dial to select OK, then press the dial. 3. After "EXECUTE" appears, press the SEL/PUSH EXEC dial. "FORMATTING" appears during formatting. "COMPLETE" appears when formatting is finished.	
PHOTO SAVE		To duplicate images on a tape onto a "Memory Stick" (p. 131).	VCR

Formatting erases all information on the "Memory Stick"

Check the contents of the "Memory Stick" before formatting:

- Formatting erases the protected image data on the "Memory Stick."



Notes on formatting

- Supplied or optional "Memory Stick"s have been formatted at the factory. Formatting with this camcorder is not required.
- While the display shows "FORMATTING," do not turn the POWER switch, press any button, or eject a "Memory Stick."
- You cannot format a "Memory Stick" if the write-protect tab on the "Memory Stick" is set to LOCK.
- Format again if the message "⌂" appears.

If formatting fails

The "⌂ FORMAT ERROR" message appears.

Changing the menu settings

Icon/item	Mode	Meaning	POWER switch
 CM SEARCH	● ON	To search using cassette memory (p. 65, 67, 68, 70).	VCR
	OFF	To search without using cassette memory.	
TAPE TITLE		To label a cassette (p. 105).	VCR CAMERA
TITLE DSPL	● ON	To display the title you have superimposed.	VCR
	OFF	Not to display the title.	
TITLEERASE	—	To erase the title you have superimposed (p. 102).	VCR CAMERA
ITEM ERASE	—	To erase each item's data in cassette memory (p. 107).	VCR CAMERA
ERASE ALL	—	To erase all the data in cassette memory (p. 108).	VCR CAMERA
 REC MODE	● SP	To record in the SP (Standard Play) mode.	VCR
	LP	To increase the recording time to 1.5 times the SP mode.	CAMERA
AUDIO MODE	● 12BIT	To record in 12-bit mode (two stereo sounds).	VCR CAMERA
	16BIT	To record in 16-bit mode (one stereo sound with high quality).	





Notes on the LP mode

- When you record a tape in the LP mode on your camcorder, we recommend playing back the tape on your camcorder. When you play back the tape on other camcorders or VCRs, noise may occur in pictures or sound.
- When you record in the LP mode, we recommend using a Sony Excellence/Master mini DV cassette so that you can get the most out of your camcorder.
- You cannot make audio dubbing on a tape recorded in the LP mode. Use the SP mode for the tape to be audio-dubbed.
- When you record in the SP and LP modes on one tape or you record some scenes in the LP mode, the playback picture may be distorted or the time code may not be written properly between scenes.

Notes on AUDIO MODE

- You cannot dub an audio sound on a tape recorded in the 16-bit mode.
- When playing back a tape recorded in the 16-bit mode, you cannot adjust the balance in AUDIO MIX.


Changing the menu settings

Icon/item	Mode	Meaning	POWER switch
  REMAIN	● AUTO	To display the remaining tape indication: <ul style="list-style-type: none"> • for about eight seconds after your camcorder is turned on and calculates the remaining amount of tape • for about eight seconds after a cassette is inserted and your camcorder calculates the remaining amount of tape • for about eight seconds after ► is pressed in VCR mode • for about eight seconds after DISPLAY is pressed to display the screen indicators • for the period of tape rewinding, forwarding or picture search in the VCR mode 	VCR CAMERA
	ON	To always display the remaining tape indicator.	
DATA CODE	● DATE/CAM	To display date, time and various settings during playback.	VCR
	DATE	To display date and time during playback.	
MIC LEVEL	● AUTO	Adjusts audio recording level automatically.	VCR
	MANUAL	Adjusts audio recording level manually (p. 52).	CAMERA
 CLOCK SET	—	To set the date or time (p. 14).	CAMERA MEMORY
LTR SIZE	● NORMAL	To display selected menu items in normal size.	VCR CAMERA
	2×	To display selected menu items at twice the normal size.	MEMORY
DEMO MODE	● ON	To make the demonstration appear.	CAMERA
	OFF	To cancel the demonstration mode.	
 WORLD TIME		To set the clock to the local time. Turn the SEL/PUSH EXEC dial to set a time difference. The clock changes by the time difference you set here. If you set the time difference to 0, the clock returns to the originally set time.	CAMERA MEMORY

Notes on DEMO MODE

- You cannot select DEMO MODE when a cassette is inserted in your camcorder.
- DEMO MODE is set to STBY (Standby) at the factory and the demonstration starts about 10 minutes after you have set the POWER switch to CAMERA without a cassette inserted.
To cancel the demonstration, insert a cassette, set the POWER switch to other than CAMERA, or set DEMO MODE to OFF.

Changing the menu settings

Icon/item	Mode	Meaning	POWER switch
 BEEP	● MELODY	To chime a melody in normal operations, and beep a warning sound for five seconds.	VCR CAMERA MEMORY
	NORMAL	To beep in the following situations: When you turn on the power, the recording starts/stops, or a warning message appears.	
	OFF	To cancel the melody, beep, and shutter click sound.	
COMMANDER	● ON	To activate the Remote Commander supplied with your camcorder.	VCR CAMERA MEMORY
	OFF	To deactivate the Remote Commander to avoid remote control misoperation caused by an other VCR's remote control.	
DISPLAY	● LCD	To show the display on the LCD screen and viewfinder screen.	VCR CAMERA MEMORY
	V-OUT/LCD	To show the display on a TV screen, LCD screen and viewfinder screen.	
REC LAMP	● ON	To light up the camera recording lamps at the front and rear of your camcorder.	CAMERA MEMORY
	OFF	To turn the camera recording lamps off.	
COLOR BAR	● OFF	Does not display the color bar.	CAMERA
	ON	Displays the color bar.	
VIDEO EDIT		To make programs and perform video editing (p. 84).	VCR
EDIT SET		To adjust and set the synchronization of your camcorder and a VCR for dubbing in video program editing mode (p. 77).	VCR

Note

If you press DISPLAY with DISPLAY set to V-OUT/LCD in the menu settings, the picture from a TV or VCR will not appear on the LCD screen even when your camcorder is connected to outputs on the TV or VCR (except using an i.LINK cable).

When recording a close subject

When REC LAMP is set to ON, the red camera recording lamps on the front and rear of the camcorder may reflect on the subject if it is close. In this case, we recommend you set REC LAMP to OFF.

After more than five minutes after removing the power source

The "PROG. SCAN," "HiFi SOUND," "AUDIO MIX," "MIC LEVEL," and "COMMANDER" items are returned to their default settings.

The other menu items are held in memory even when the power source is removed.

Using a “Memory Stick” – introduction

The “Memory Stick” is a new light and small recording media which, despite its size, can store more data than a floppy disk.

You can use following types of “Memory Stick” on your camcorder. However, appearance on the list does not guarantee the operation of all types of “Memory Stick” on your camcorder.

Types of “Memory Stick”	Recording / Playback
“Memory Stick”	○
“Memory Stick Duo”*	○
“MagicGate Memory Stick”	○**
“MagicGate Memory Stick Duo”*	○**
“Memory Stick PRO”	–
“Memory Stick PRO Duo”*	–

* Attach the Memory Stick Duo adaptor before inserting it into the camcorder.

** “MagicGate” is a copyright protection technology that records and transfers the contents in an encrypted format. Note that data that uses “MagicGate” technology cannot be recorded or played on your camcorder.

On file format (JPEG)

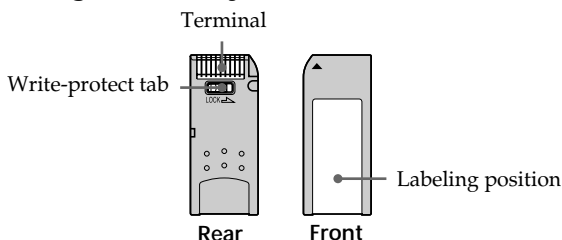
Your camcorder compresses image data in JPEG format (extension .jpg).

Typical image data file name

100-0001: As displayed on the LCD screen or in the viewfinder of the camcorder.

Dsc00001.jpg: As displayed on your PC screen.

Before using a “Memory Stick”



- You cannot record or erase still images when the write-protect tab on the “Memory Stick” is set to LOCK.
- We recommend backing up important data.
- Image data may be damaged in the following cases:
 - If you remove the “Memory Stick,” turn the power off, or detach the battery for replacement when the access lamp is flashing.
 - If you use a “Memory Stick” near static electricity or magnetic fields.
- Prevent metallic objects or your finger from coming into contact with the metal parts of the connecting section.
- Stick its label on the labeling position.
- Do not bend, drop or apply strong shock to a “Memory Stick.”
- Do not disassemble or modify a “Memory Stick.”
- Do not let the “Memory Stick” get wet.
- Do not use or keep a “Memory Stick” in locations that are:
 - Extremely hot such as in a car parked in the sun or under the scorching sun.
 - Under direct sunlight.
 - Very humid or subject to corrosive gases.
- When you carry or store a “Memory Stick,” put it in its case.

A “Memory Stick” formatted by a computer

A “Memory Stick” formatted by the Windows OS or Macintosh computers does not have a guaranteed compatibility with this camcorder.

Note on using the “Memory Stick Duo”

You can use a “Memory Stick Duo” in your camcorder after inserting it into the Memory Stick Duo adaptor.


You may damage the “Memory Stick Duo” or the Memory Stick slot on your camcorder in the following situations.

- When you insert a “Memory Stick Duo” that is not inserted into a Memory Stick Duo adaptor into the Memory Stick slot on your camcorder.
- When you insert the “Memory Stick Duo” in the wrong direction.

If you insert a “Memory Stick Duo” without a Memory Stick Duo adaptor by mistake, hold the camcorder so the Memory Stick slot is facing down, then hold the lid aside using a toothpick or similar object to let the “Memory Stick Duo” slide out.

Notes on image data compatibility

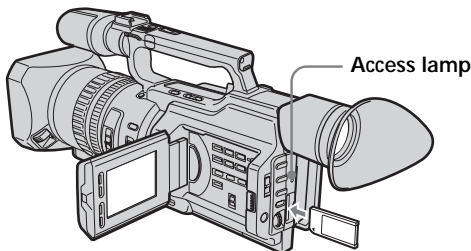
- Image data files recorded on a “Memory Stick” by your camcorder conform to the Design Rules for Camera File Systems universal standard (DCF98 standard) established by the JEIDA (Japan Electronic Industry Development Association). You cannot play back on your camcorder still images recorded on other equipment (DCR-TRV890E/TRV900/TRV900E or DSC-D700/D770) that does not conform to this universal standard. (These models are not sold in some areas.)
- If you cannot use a “Memory Stick” that is used with other equipment, format it with this camcorder (p. 112). However, formatting erases all information on the “Memory Stick.”

-
- “Memory Stick”,  and “MagicGate Memory Stick” are trademarks of Sony Corporation.
 - “Memory Stick Duo” and “**MEMORY STICK DUO**” are trademarks of Sony Corporation.
 - “Memory Stick PRO” and “**MEMORY STICK PRO**” are trademarks of Sony Corporation.
 - “MagicGate” and “**MAGIC GATE**” are trademarks of Sony Corporation.
 - All other product names mentioned herein may be the trademarks or registered trademarks of their respective companies.
- Furthermore, “TM” and “®” are not mentioned in each case in this manual.

Using a “Memory Stick” – introduction

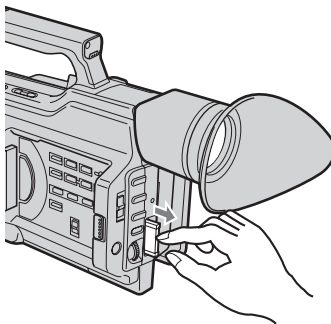
Inserting a “Memory Stick”

Insert the “Memory Stick” with the Sony logo pointing toward the LCD panel and the ◀ mark pointing inward.



To eject a “Memory Stick”

Push the “Memory Stick” inward, then release your finger. The “Memory Stick” comes out a little.



Note

The “Memory Stick” may pop out depending on the way you push it.

When the access lamp is lit or flashing

Never shake or strike your camcorder. Do not turn the power off, eject a “Memory Stick” or remove the battery pack. Otherwise, image data breakdown may occur.


If the “MEMORY STICK ERROR” indicator appears

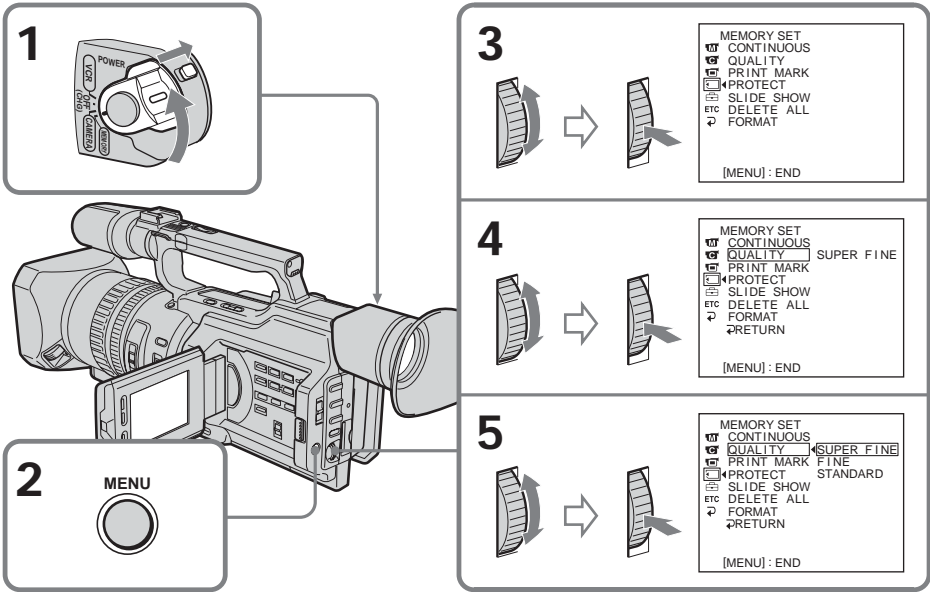
The “Memory Stick” is broken, the file format is not proper, or the “Memory Stick” that you are using is not compatible with your camcorder. Eject the “Memory Stick”, check it, and insert again (p. 116).

Using a “Memory Stick” – introduction

Selecting the image quality mode

You can select the image quality mode in still picture recording. The default setting is SUPER FINE.

- (1) Set the POWER switch to VCR or MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Press MENU to display the menu.
- (3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select QUALITY, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select the desired image quality, then press the dial.



“Memory Stick” Operations

Image quality settings

Setting (Display)	Meaning
SUPER FINE (SFN)	This is the highest image quality in this camcorder. The number of still images you can record is fewer than FINE. The image is compressed to about 1/3.
FINE (FINE)	Use this mode when you want to record high quality images. The image is compressed to about 1/6.
STANDARD (STD)	This is the standard image quality. The image is compressed to about 1/10.

Note

In some cases, changing the image quality mode may not affect the image quality, depending on the types of images you are shooting.

Using a “Memory Stick” – introduction

Differences in image quality mode

Recorded images are compressed in JPEG format before being stored in memory. The memory capacity allotted to each image varies depending on the image quality mode selected. Details are shown in the table below.

Image quality mode	Memory capacity
SUPER FINE	Approx. 190 KB
FINE	Approx. 100 KB
STANDARD	Approx. 60 KB

Note on the image quality mode indicator

This is only displayed during recording.

The approximate number of images you can record on a “Memory Stick”

The approximate number of images you can record on a “Memory Stick” that is formatted using this camcorder varies depending on which image quality mode you select and the complexity of the subject.

	Image quality mode		
	SUPER FINE (SFN)	FINE (FINE)	STANDARD (STD)
8 MB type (supplied)	40 images	80 images	120 images
16 MB type (optional)	80 images	160 images	240 images
32 MB type (optional)	160 images	325 images	485 images
64 MB type (optional)	325 images	650 images	980 images
128 MB type (optional)	650 images	1310 images	1970 images

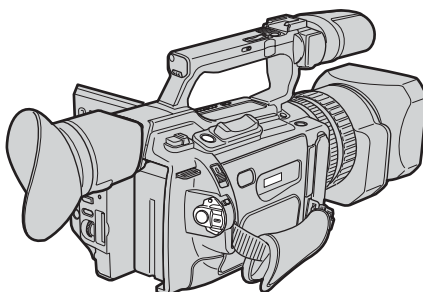
Recording still images on a “Memory Stick” – Memory Photo recording

You can record still images on a “Memory Stick.”

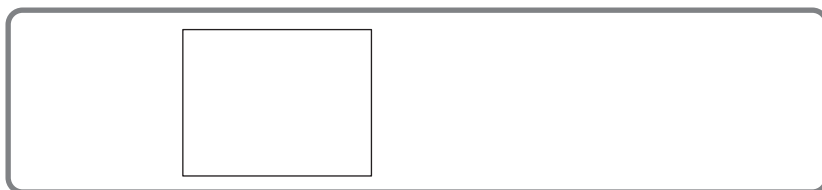
Before operation

Insert a “Memory Stick” into your camcorder.

- (1) Set the POWER switch to MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Keep pressing PHOTO lightly until the desired still picture appears. The green ● mark stops flashing, then lights up. The brightness of the picture and focus are re-adjusted, being targeted for the middle of the picture and are fixed. Recording does not start yet.
- (3) Press PHOTO deeply. The shutter clicks and the image is frozen. The image displayed on the screen will be recorded on the “Memory Stick.” Recording is complete when the bar scroll indicator disappears.



“Memory Stick” Operations



[a] The number of images that can be recorded on the “Memory Stick”

[b] The number of recorded images

When the POWER switch is set to MEMORY

The following functions do not work: wide TV mode, digital effect, picture effect, title, digital zoom, fader, shutter speed (1/30 or smaller) adjustment, and low lux mode and sports lesson mode in PROGRAM AE. (The indicator flashes in the low lux or sports lesson mode.)

Note

When you press the PHOTO button lightly at step 2, the focus of the image seems to be momentarily out.


Recording still images on a “Memory Stick” – Memory Photo recording

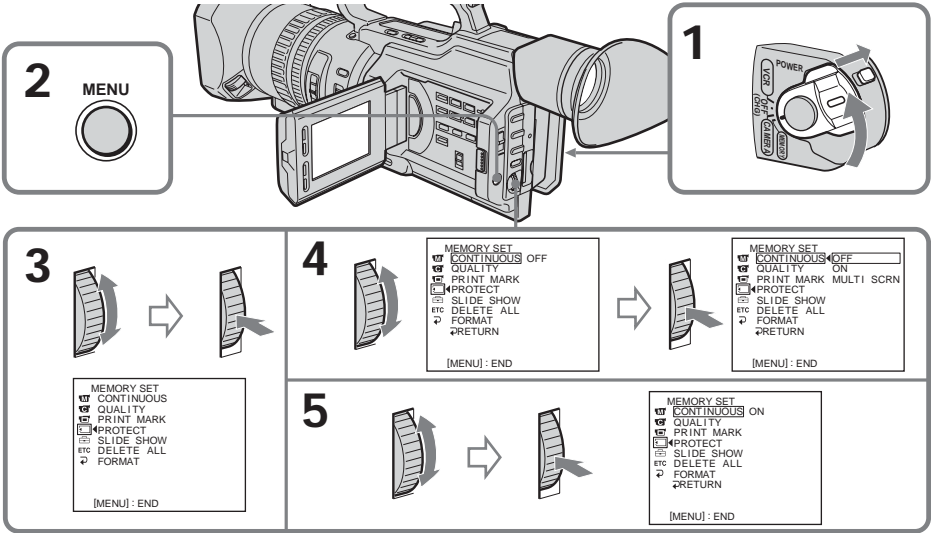
While you are recording a still image

You can neither turn off the power nor press PHOTO.

When you press PHOTO on the Remote Commander



Recording still images on a “Memory Stick” – Memory Photo recording

- (1) Set the POWER switch to MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Press MENU to display the menu.
- (3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select CONTINUOUS, then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select the desired setting, then press the dial.




“Memory Stick” Operations

Continuous shooting settings

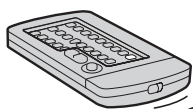
Setting	Meaning (indicator on the screen)
OFF	Your camcorder shoots one image at a time. (no indicator)
ON	Your camcorder shoots up to four still images at about 0.5 sec intervals. ()
MULTI SCR	Your camcorder shoots nine still images at about 0.5 sec intervals and displays the images on a single page divided into nine boxes. ()

If the capacity of the “Memory Stick” becomes full

“ FULL” appears on the screen, and you cannot record still pictures on this “Memory Stick.”

The number of images in continuous shooting

The number of images you can shoot continuously varies depending on the remaining capacity of the “Memory Stick.” The shutter always clicks four times, however, the number of images recordable may be less than four.



Superimposing a still image in a “Memory Stick” on a moving picture – MEMORY MIX

You can superimpose a still image you have recorded on a “Memory Stick” on the top of the moving picture you are recording.

M. CHROM (Memory chromakey)

You can swap a blue area of a still image such as an illustration or a frame with a moving picture.

M. LUMI (Memory luminancekey)

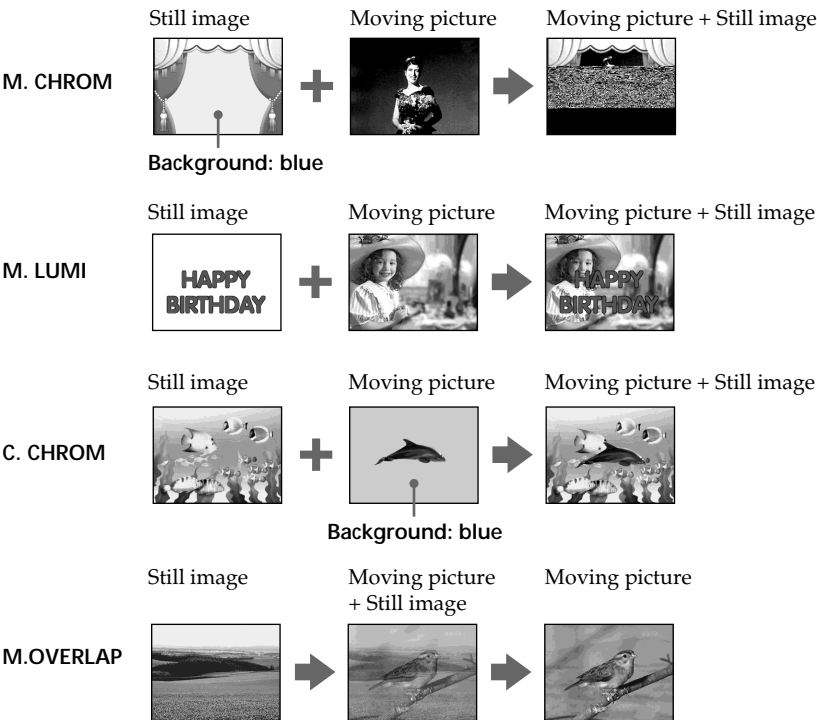
You can swap a brighter area of a still image such as a handwritten illustration or title with a moving picture. Record a title on a “Memory Stick” before a trip or event for convenience.

C. CHROM (Camera chromakey)

You can superimpose a moving picture on a still image that used as background. Shoot the subject against a blue background. The blue area of the moving picture will be swapped with a still image.

M. OVERLAP (Memory overlap)

You can make a moving picture fade in on top of a still image.



Superimposing a still image in a “Memory Stick” on a moving picture – MEMORY MIX

Before operation

Insert a recorded “Memory Stick” and a tape to be recorded into your camcorder.

- (1) Set the POWER switch to CAMERA.
- (2) Press MEMORY MIX in standby mode.
The last recorded or last composed image appears on the lower part of the screen as a thumbnail image.
- (3) Press MEMORY+/- or +/- on the Remote Commander to select the still image you want to superimpose.
To see the previous image, press MEMORY – or – on the Remote Commander.
To see the next image, press MEMORY+ or + on the Remote Commander.
- (4) Turn the SEL/PUSH EXEC dial to select the desired mode.
The mode changes as follows:
M. CHROM ↔ M. LUMI ↔ C. CHROM ↔ M. OVERLAP
- (5) Press the SEL/PUSH EXEC dial.
The still image is superimposed on the moving picture, and your camcorder is in standby mode.
- (6) Turn the SEL/PUSH EXEC dial to adjust the effect.
- (7) Press START/STOP to start recording.

Superimposing a still image in a “Memory Stick” on a moving picture – MEMORY MIX

Items to be adjusted

M. CHROM	The color (blue) scheme of the area in the still picture which is to be swapped with a moving picture
M. LUMI	The color (bright) scheme of the area in the still picture which is to be swapped with a moving picture
C. CHROM	The color (blue) scheme of the area in the moving picture which is to be swapped with a still picture
M. OVERLAP	No adjustment necessary

As the bar is shorter, the effect is enhanced.

To change the still image to be superimposed

Do either of the following:

- Press MEMORY+/- after step 6.
- Press the SEL/PUSH EXEC dial after step 6, and repeat the procedure from step 3 (except M. OVERLAP).

To change the mode setting

Press SEL/PUSH EXEC dial after step 6, and repeat the procedure from step 4 (except M. OVERLAP).

To cancel MEMORY MIX

Press MEMORY MIX.

During recording

You cannot change the mode setting.

If a still image to be superimposed has lots of white areas

The thumbnail image may not be displayed clearly.

Image data modified with personal computers or shot with other equipment

You may not be able to play them back with your camcorder.

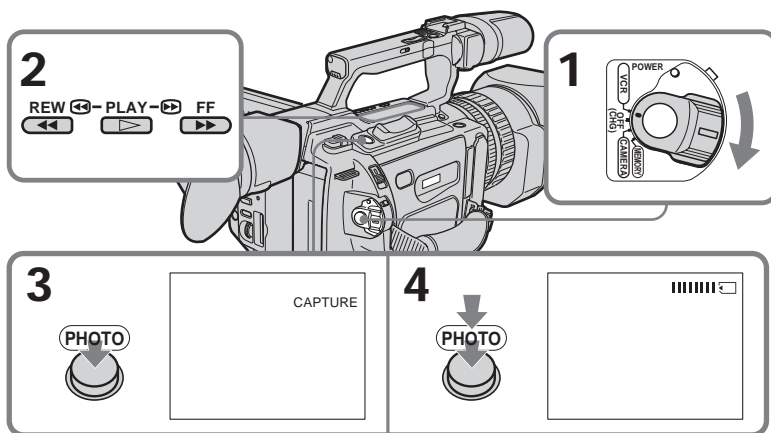
Recording an image from a tape as a still image

Your camcorder can read moving picture data recorded on a tape and record it as a still image on a "Memory Stick." Your camcorder can also take in moving picture data through the input connector and record it as a still image on a "Memory Stick."

Before operation

Insert a recorded tape and a "Memory Stick" into your camcorder.

- (1) Set the POWER switch to VCR.
- (2) Press ►. The picture recorded on the tape is played back.
- (3) Keep pressing PHOTO lightly until the picture from the tape freezes.
"CAPTURE" appears on the LCD screen or in the viewfinder. Recording does not start yet.
- (4) Press PHOTO deeper. The image displayed on the screen will be recorded on a "Memory Stick." Recording is complete when the bar scroll indicator disappears.



When the access lamp is lit or is flashing

Never shake or strike the unit. Also, do not turn the power off, eject a "Memory Stick" or remove the battery pack. Otherwise, image data breakdown may occur.

If "⚠" appears on the LCD screen or in the viewfinder

The inserted "Memory Stick" is incompatible with your camcorder because its format does not conform to that of your camcorder. Check the format of the "Memory Stick."

If you press PHOTO lightly in the playback mode

The playback pauses momentarily.

Sound recorded on a tape

You cannot record the sound from a tape.

Recording an image from a tape as a still image

Titles that are already recorded on tapes

You cannot record the titles on a "Memory Stick."

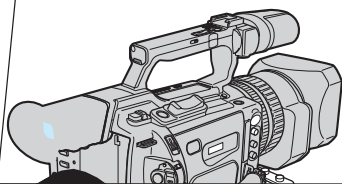
When you press PHOTO on the Remote Commander

Your camcorder immediately records the image that is on the screen when you press the button.

Recording a still image from other equipment

- (1) Set the POWER switch to VCR on your camcorder and set DISPLAY in ETC to LCD in the menu settings.
- (2) Play back the recorded tape, or turn the TV on to see the desired program. The picture from the other equipment appears on the LCD screen or in the viewfinder.
- (3) Follow steps 3 and 4 on page 128.

When recording an image through the VIDEO jack



"Memory Stick" Opera

Connect the yellow plug of the A/V connecting cable supplied with your camcorder to the video input jack on the VCR or the TV.

Connect using an S video cable (optional) to obtain high quality pictures

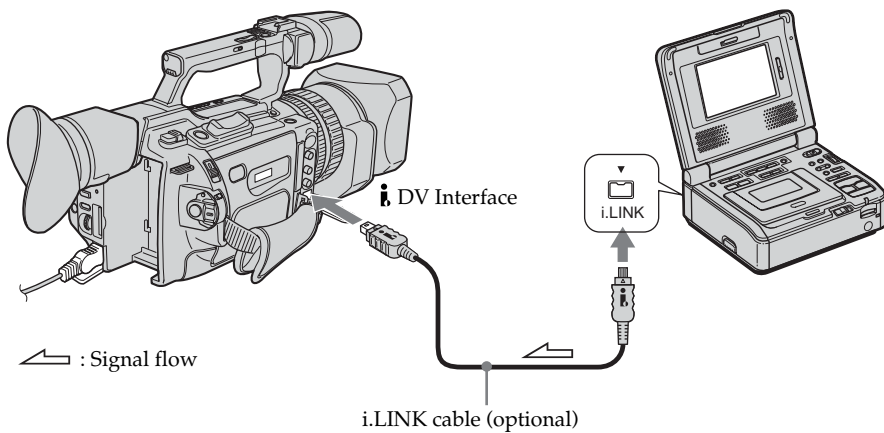
With this connection, you do not need to connect the yellow (video) plug of the A/V connecting cable.

Connect an S video cable to the S video jacks of both your camcorder and VCR/TV.

This connection produces higher quality pictures in the V format.

Recording an image from a tape as a still image

When recording the image through the **i** DV Interface




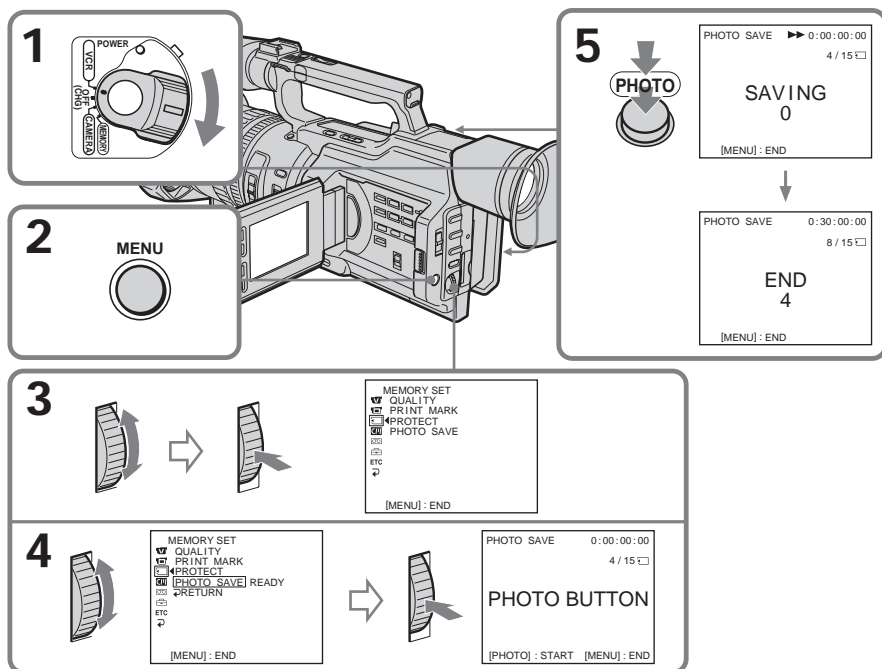
Copying still images from a tape – Photo save

Using the search function, you can automatically take in only still images from tapes and record them on a “Memory Stick” in sequence.

Before operation

- Insert a recorded tape into your camcorder and rewind the tape.
- Insert a “Memory Stick” into your camcorder.

- (1) Set the POWER switch to VCR.
- (2) Press MENU to display the menu.
- (3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select PHOTO SAVE, then press the dial. “PHOTO BUTTON” appears on the LCD screen or in the viewfinder.
- (5) Press PHOTO deeply. The still image from the tape is recorded on the “Memory Stick.” The number of still images copied is displayed. “END” is displayed when copying is completed.



“Memory Stick” Operations

Copying still images from a tape – Photo save

To cancel copying

Press MENU.

When the memory of the “Memory Stick” is full

“MEMORY FULL” appears on the LCD screen or in the viewfinder, and the copying stops. Insert another “Memory Stick” and repeat the procedure from step 2.

When the access lamp is lit or flashing

Never shake or strike your camcorder. Also, do not turn the power off, eject the “Memory Stick” or remove the battery pack. Otherwise, the image data breakdown may occur.

To record all the images recorded on the tape

Rewind the tape all the way back and start copying.

If the write-protect tab on the “Memory Stick” is set to LOCK

“NOT READY” appears when you select the item in the menu settings.

When you change the “Memory Stick” in the middle of copying

Your camcorder resumes copying from the last image recorded on the previous “Memory Stick.”

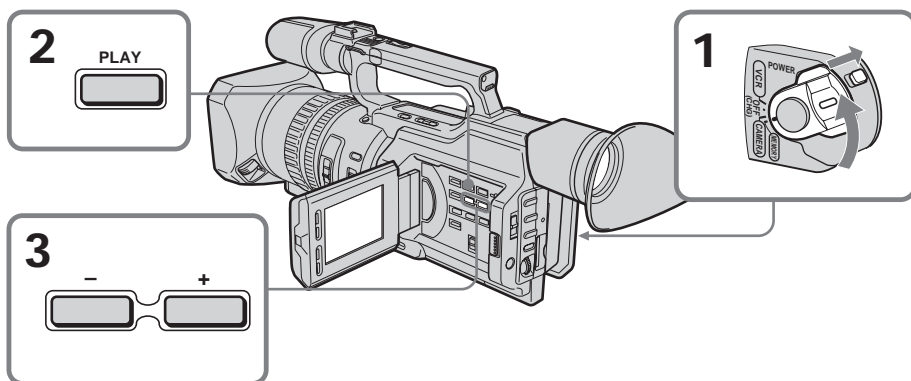
Viewing a still picture – Memory Photo playback

You can play back still images recorded on a “Memory Stick.” You can also play back six images at a time by selecting the index screen.

Before operation

Insert a “Memory Stick” into your camcorder.

- (1) Set the POWER switch to VCR or MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Press MEMORY PLAY. The last recorded image is displayed.
- (3) Press MEMORY +/– or +/– on the Remote Commander to select the desired still image. To see the previous image, press MEMORY – or – on the Remote Commander. To see the next image, press MEMORY + or + on the Remote Commander.



To stop memory photo playback

Press MEMORY PLAY again.

To play back recorded images on a TV screen

- Connect your camcorder to the TV with the A/V connecting cable supplied with your camcorder before operation.
- When operating memory photo playback on a TV or on the LCD screen, the image quality may appear to have deteriorated. This is not a malfunction. The image data is as good as ever.
- Turn the volume of the TV down before operation, or noise (howling) may be output from the TV speakers.

When no images are recorded on the “Memory Stick”

The message “ NO FILE” appears.

Image data modified with personal computers or shot with other equipment

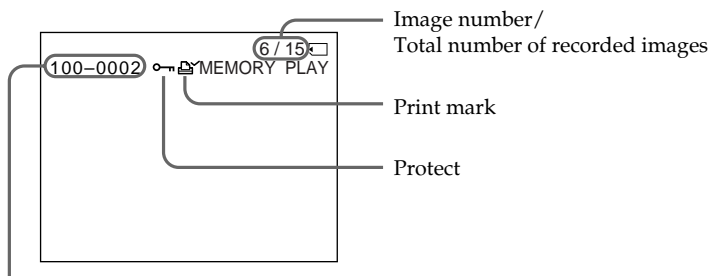
You may not be able to play them back with your camcorder.

Note on the date/time indicator

Recording date/time is not displayed, however, it is automatically recorded on the “Memory Stick.” You can check the recording date/time while in memory playback mode by pressing DATA CODE.

Viewing a still picture – Memory Photo playback

Screen indicators during still image playback



Data file name

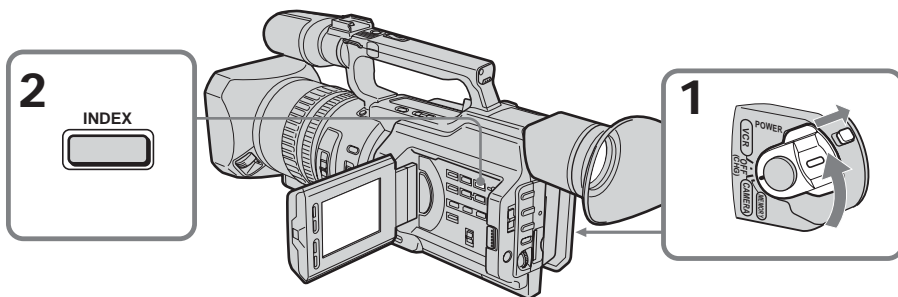
On data file name

- When the hyphen is indicated between the directory and the file number, this data file name means that this file corresponds to the DCF98 standard.
- When the underbar is indicated between the directory and the file number, this data file name means that this file does not correspond to the DCF98 standard.
- The directory is not indicated if the file structure in the "Memory Stick" does not correspond to the DCF98 standard.
- The "MEMORY ERROR" message may appear if the file structure in the "Memory Stick" does not correspond to the DCF98 standard. In this case, you cannot record on that "Memory Stick," however, you can play back images in the "Memory Stick."
- When the data file name flashes, the file may be broken or the file format does not correspond to your camcorder.

Playing back six recorded images at a time (index screen)

You can play back six recorded images at a time. This function is especially useful when searching for a particular image.

- (1) Set the POWER switch to VCR or MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Press MEMORY INDEX to display the index screen.

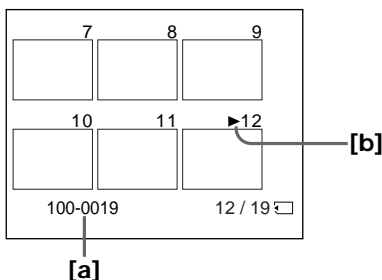


Viewing a still picture – Memory Photo playback

A red ► mark appears above the image that is displayed before changing to the index screen mode.

MEMORY – : to display the previous six images

MEMORY + : to display the following six images



[a] File name

[b] ► mark

To return to the normal playback screen (single screen)

Press MEMORY +/- to move the ► mark to the image you want to display on full screen, then press MEMORY PLAY.

Files modified with personal computers

These files may not be displayed on the index screen. Image files shot with other equipment may not be displayed on the index screen either.

Note

When displaying the index screen, a number appears above each image. This indicates the order in which images are recorded on the "Memory Stick." These numbers are different from the data file names.

Viewing the recorded images using a personal computer

The image data recorded with your camcorder is compressed in the JPEG format. You can see images recorded on a "Memory Stick" on a computer screen. Use the Memory Stick Reader/Writer (optional) or PC card adaptor for Memory Stick (optional) or floppy disk adaptor for Memory Stick (optional) for this operation. For detailed instructions on operation, refer to the operating instructions of your computer and the Memory Stick Reader/Writer, PC card adaptor for Memory Stick, or floppy disk adaptor for Memory Stick. For details, refer to the operating instructions of your accessory.

- Do not modify the directory of the file that corresponds to the DCF98 standard. The modified file will not be read.
- If you use the new "Memory Stick," be sure to use it first with this camcorder.

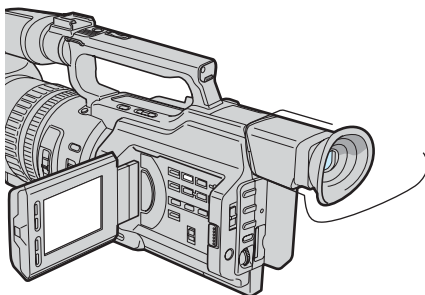
Copying an image recorded on a "Memory Stick" to tapes

You can copy still images or titles recorded on a "Memory Stick" to a tape.

Before operation

Insert a tape for recording and a "Memory Stick" for playback into your camcorder.

- (1) Set the POWER switch to VCR.
- (2) Using the video control buttons, search for a point where you want to record the desired still image. Set the tape to playback pause mode.
- (3) Press ● REC and the button on its right simultaneously on your camcorder. The tape is set to the recording pause mode.
- (4) Press MEMORY PLAY to play back the still image you want to copy.
- (5) Press ■ to start recording and press ■ again to stop.
- (6) If you have more to copy, repeat steps 4 and 5.



To stop copying in the middle

Press ■.

During copying

- You cannot operate the following buttons:
MEMORY PLAY, MEMORY INDEX, MEMORY DELETE, MEMORY +, MEMORY -,
and MEMORY MIX.
- If you continue copying, do not use EDITSEARCH to search for the point where you want to record the desired still image. If you do, the playback image disappears from the screen.

Copying an image recorded on a “Memory Stick” to tapes

Note on the index screen

You cannot record the index screen.

Image data modified with personal computers or shot with other equipment

You may not be able to copy them with your camcorder.

If you press DISPLAY in standby or recording mode

You can see memory playback and the file name indicators in addition to the indicators pertinent to tapes, such as the time code indicator.


Playing back images continuously

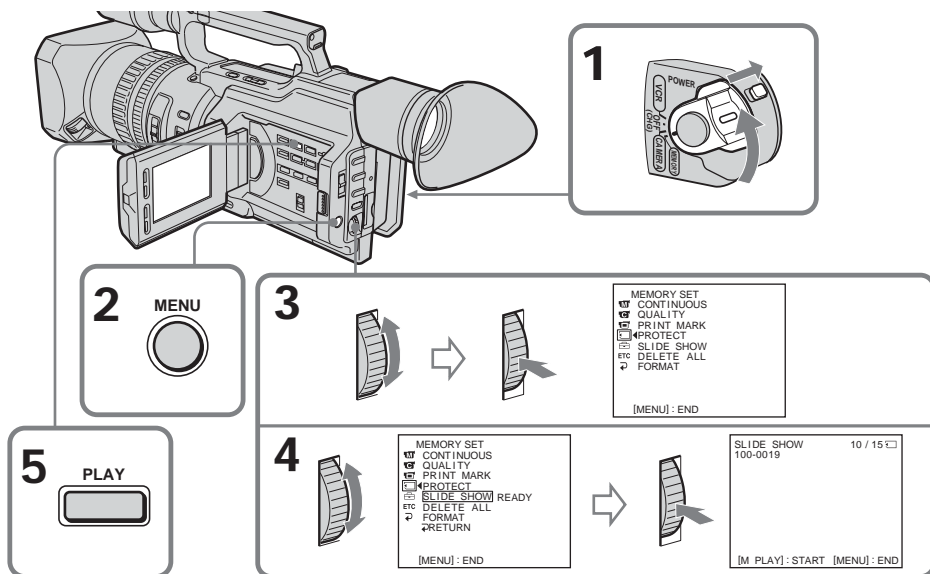
– SLIDE SHOW

You can automatically play back images in sequence. This function is useful especially when checking recorded images or during a presentation.

Before operation

Insert a “Memory Stick” into your camcorder.

- (1) Set the POWER switch to MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Press MENU to display the menu.
- (3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (4) Turn the SEL/PUSH EXEC dial to select SLIDE SHOW, then press the dial.
- (5) Press MEMORY PLAY. Your camcorder plays back the images recorded on the “Memory Stick” in sequence.



To stop or end the slide show

Press MENU.

To pause during a slide show

Press MEMORY PLAY.

To start the slide show from a particular image

Select the desired image using MEMORY +/– buttons before step 2.

To view the recorded images on TV

Connect your camcorder to a TV with the A/V connecting cable supplied with your camcorder before operation.

If you change the “Memory Stick” during operation

Be sure to follow the steps again from the beginning.


Preventing accidental erasure

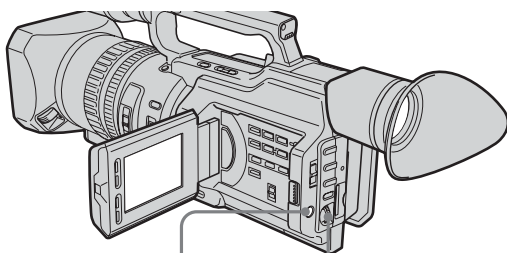
- Image protection

To prevent accidental erasure of important images, you can protect selected images.

Before operation

Insert a "Memory Stick" into your camcorder.

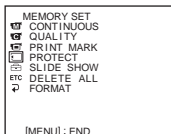
- (1) Set the POWER switch to MEMORY or VCR. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Play back the image you want to protect (p. 133).
- (3) Press MENU to display the menu.
- (4) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select PROTECT, then press the dial.
- (6) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
- (7) Press MENU to erase the menu display. The "ON" mark is displayed beside the data file name of the protected image.



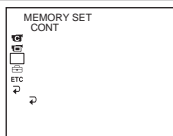
1

3,7

4



5



6



To cancel image protection

Select OFF in step 6, then press the SEL/PUSH EXEC dial.

Note

Formatting erases all information on the "Memory Stick," including the protected image data. Check the contents of the "Memory Stick" before formatting.

If the write-protect tab on the "Memory Stick" is set to LOCK

You cannot carry out image protection.

Deleting images

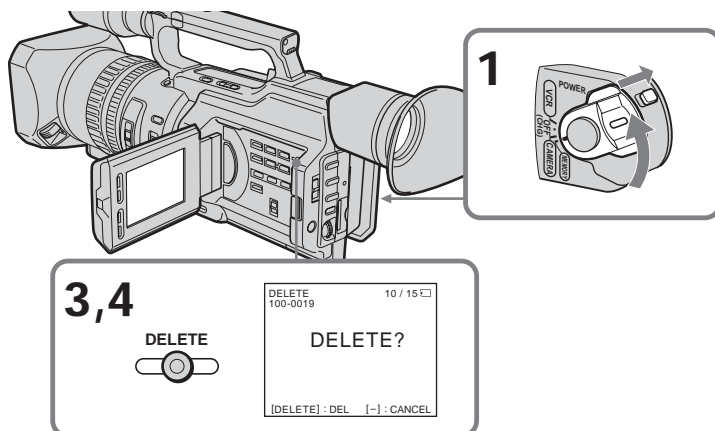
You can delete images stored in a “Memory Stick.”

Deleting selected images

Before operation

Insert a “Memory Stick” into your camcorder.

- (1) Set the POWER switch to MEMORY or VCR. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Play back the image you want to delete (p. 133).
- (3) Press MEMORY DELETE. “DELETE?” appears on the LCD screen or in the viewfinder.
- (4) Press MEMORY DELETE again. The selected image is deleted.



To cancel deleting an image

Press MEMORY – in step 4.

To delete an image displayed on the index screen

Press MEMORY +/- to move the ► mark to the desired image and follow steps 3 and 4.

Notes

- To delete a protected image, first cancel image protection.
- Once you delete an image, you cannot restore it. Check the images to be deleted carefully before deleting them.

While “DELETING” appears

Do not turn the POWER switch or press any buttons.

If the write-protect tab on the “Memory Stick” is set to LOCK

You cannot delete any image.

is



Deleting images

To cancel deleting all the images in the “Memory Stick”

Select RETURN in step 5 or 6, then press the SEL/PUSH EXEC dial.



Writing a print mark – Print mark

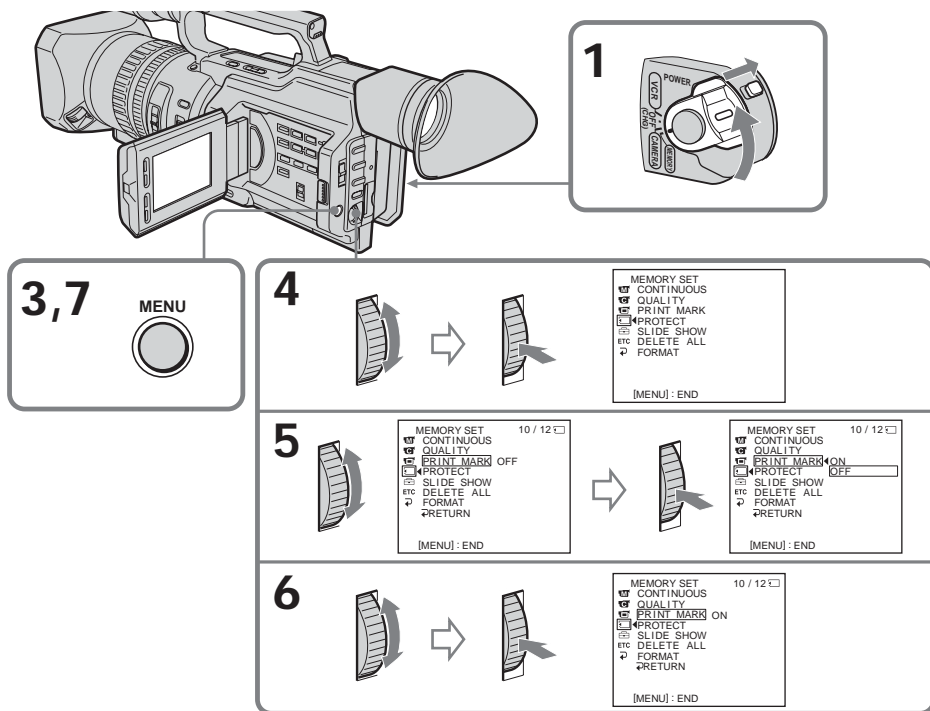
You can specify the recorded still image to be printed out. This function is useful for printing out still images later.

Your camcorder conforms with the DPOF (Digital Print Order Format) standard for specifying the still images to be printed out.

Before operation

Insert a “Memory Stick” into your camcorder.

- (1) Set the POWER switch to MEMORY or VCR. Make sure that the LOCK switch is set to the right (unlock) position.
- (2) Play back the image to be printed out (p. 133).
- (3) Press MENU to display the menu.
- (4) Turn the SEL/PUSH EXEC dial to select , then press the dial.
- (5) Turn the SEL/PUSH EXEC dial to select PRINT MARK, then press the dial.
- (6) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
- (7) Press MENU to erase the menu display. The “” mark is displayed beside the data file name of an image.



To cancel writing print marks

Select OFF in step 6, then press the SEL/PUSH EXEC dial.

If the write-protect tab on the “Memory Stick” is set to LOCK

You cannot write print marks on still images.

Usable cassettes

Selecting cassette types

You can use the **Mini DV** mini DV cassette only*. You cannot use any other **8** 8 mm, **Hi8** Hi8, **D** Digital8, **VHS** VHS, **VHS-C** VHS-C, **S-VHS** S-VHS, **S-VHS-C** S-VHS-C, **B** Betamax, **ED Beta** ED Betamax, **DV** DV or **MICROMV** MICROMV cassette.

* There are two types of mini DV cassettes: with cassette memory and without cassette memory. Tapes with cassette memory have **CM** (Cassette Memory) mark. Sony recommends that you use a tape with **CM** mark to enjoy your camcorder fully.

The IC memory is built in the cassette with cassette memory. Using this IC memory, your camcorder can read, write, and search data such as the date of recording or titles. The functions using the cassette memory require successive signals recorded on the tape. If the tape has a blank portion in the beginning or between the recorded portions, a title may not be displayed properly or the search functions may not work correctly. Not to make any blank portion on the tape, press END SEARCH to return to the end of the recorded portion before you begin the next recording when:

- You have ejected the cassette while recording.
- You have played back the tape in VCR mode.

If there is a blank portion or discontinuous signal on your tape, re-record from the beginning to the end of the tape concerning above.

When you record, using a digital video camera recorder without a cassette memory function, on a tape recorded by one with the cassette memory function, the same result may occur.

CM 4K mark on the cassette

The memory capacity of tapes marked with **CM 4K** is 4 K bits. Your camcorder can accommodate up to 16 K bits. 16 K bits tape is marked with **CM 16K**.

The maximum number of data recordable on cassette memory (when using 4 K bits cassette memory)

Data	Numbers
INDEX	32 (15 bytes/one item of the data)
TITLE	25
DATE	6 (10 bytes/one item of the data)
PHOTO	12 (10 bytes/one item of the data)
CASSETTE LABEL	1

The numbers above are as a guide.

Copyright signal

When you play back

When you connect your camcorder to any other video camera recorder to dub a tape that has recorded copyright control signals for copyright protection, you may not record the tape that played back on your camcorder.

When you record

You cannot record software on your camcorder that contains copyright control signals for copyright protection of software.

“COPY INHIBIT” appears on the LCD screen, in the viewfinder or on the TV screen if you try to record such software.

Your camcorder does not record copyright control signals on the tape when it records.

Usable cassettes

Audio mode

16-bit mode: The original sound can be recorded in stereo 1, and the new sound in stereo 2 in 32 kHz. The balance between stereo 1 and stereo 2 can be adjusted by selecting AUDIO MIX in the menu settings during playback. Both sounds can be played back.

16-bit mode: A new sound cannot be recorded but the original sound can be recorded in high quality. Moreover, it can also play back sound recorded in 32 kHz, 44.1 kHz or 48 kHz. When playing back a tape recorded in the 16-bit mode, 16BIT indicator appears on the LCD screen or in the viewfinder.

When you play back a dual sound track tape

When you play back a dual sound track tape recorded in a stereo system, set HiFi SOUND to the desired mode in the menu settings (p. 109).

Sound from speaker

HiFi SOUND mode	Playing back a stereo tape	Playing back a dual sound track tape
STEREO	Stereo	Main sound and sub sound
1	Left sound	Main sound
2	Right sound	Sub sound

You cannot record dual sound programs on your camcorder.

Notes on the mini DV cassette

When affixing a label on the mini DV cassette

Be sure to affix a label only on the locations as illustrated below [a] so as not to cause malfunction of your camcorder.

After using the mini DV cassette

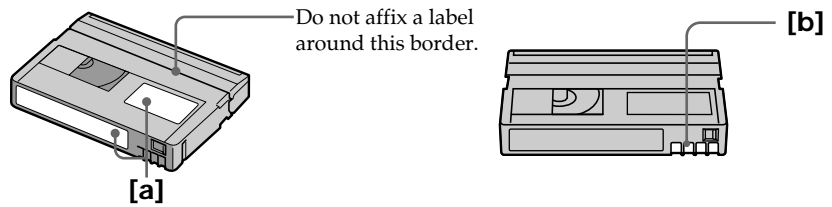
Rewind the tape to the beginning, put the cassette in its case, and store it in an upright position.

If the cassette memory function does not work

Reinsert a cassette a few times. The gold-plated connector of mini DV cassettes may be dirty or dusty.

Cleaning the connector

If the gold-plated connector of mini DV cassettes is dirty or dusty, you may not operate the function using cassette memory. Clean up the gold-plated connector with cotton-wool swab, about every 10 times ejection of a cassette. [b]



About i.LINK

Your camcorder is equipped with the DV Interface based on i.LINK (IEEE1394) standard.

This section explains the specifications and features of i.LINK.

What is i.LINK?

i.LINK is a digital serial interface designed to integrate the devices equipped with i.LINK connector. By connecting i.LINK devices, i.LINK allows your device to:

- Transmit and receive data such as digital audio and digital video signals in two ways
- Control other i.LINK devices
- Easily connect with another device using just an i.LINK cable.

Your i.LINK device is capable of connecting AV devices and perform various operations and data transfer. Further availability for connections with versatile equipment and operations will be planned in the future.

Other advantages include the following feature. When connecting multiple i.LINK devices, your device cannot only perform operations and data transfer with the directly connected device but also perform them with any of the devices that are connected via other devices. Therefore, you will not need to concern the order of connecting devices. However, depending on the features and specifications of the connected devices, you may need to operate certain functions differently or may not be able to perform certain operations or data transfer.

Note

Your camcorder can be connected to one device with the i.LINK cable.

When you connect with a device that has two or more i.LINK connectors, refer to the operating instructions supplied with the connected device.

Tips

- i.LINK, a nickname for IEEE 1394 that Sony proposed, is a trademark supported by a majority of companies worldwide.
- IEEE 1394 is an international standard defined by IEEE, The Institute of Electrical and Electronics Engineers, Inc.

About data transfer speed of i.LINK

i.LINK defines a maximum data transfer speed of approximately 100, 200 and 400 Mbps* that are described as S100, S200 and S400 respectively.

For i.LINK devices, a maximum data transfer speed that the device supports is identified on "Specifications" page of the operating instructions supplied with the device or near its i.LINK connector.

With a device that does not identify the data transfer speed, the maximum data transfer speed that the device supports is S100.

When connecting with the device that support different data transfer speed, the actual data transfer speed may be different from those described on the i.LINK connectors.

*What is Mbps?

Mega bits per second. A measure of the rate at which data is transmitted per second. In case of 100 Mbps, 100 Mega bits of data can be transmitted per second.

i. LINK operation with your camcorder

For details on dubbing your camcorder to your VCR equipped with DV Interface, see page 75, 91.

Your camcorder is available for use with other devices equipped with Sony i.LINK connector (DV Interface) (eg. VAIO personal computer series).


Beware that some of the video equipment such as the Digital Televisions, the DVD recorders/players or the MICROMV recorders/players are equipped with the i.LINK connector but not compatible with the DV equipment. Be sure to confirm whether the equipment is compatible with the DV equipment or not before connecting your camcorder to it.

For details on connection with i.LINK cable and necessary software, refer to the operating instructions supplied with the connected device.

Use Sony i.LINK cables

Use Sony i.LINK cables to connect the i.LINK devices.

4 pins ↔ 4 pins (For dubbing)

i.LINK and  are trademarks.


Troubleshooting

If you run into any problem using your camcorder, use the following table to troubleshoot the problem. If the problem persists, disconnect the power source and contact your Sony dealer or local authorized Sony service facility. If “C:□□:□□” appears on the LCD screen, display window or in the viewfinder, the self-diagnosis display function has worked. See page 154.

In the recording mode

Symptom	Cause and/or Corrective Actions
START/STOP does not operate.	<ul style="list-style-type: none">• The POWER switch is not set to CAMERA. → Set it to CAMERA. (p. 16)• The tape has run out. → Rewind the tape or insert a new one. (p. 15, 30)• The write-protect tab on the cassette is set to SAVE. → Use a new tape or slide the tab. (p. 15)• The tape is stuck to the drum (moisture condensation). → Remove the cassette and leave your camcorder for at least one hour to acclimatize. (p. 158)
The power goes off.	<ul style="list-style-type: none">• While being operated in CAMERA mode, your camcorder has been in the standby mode for more than five minutes. → Set the POWER switch to OFF (CHG) and then to CAMERA again. (p. 17)• The battery pack is dead or nearly dead. → Install a charged battery pack. (p. 9, 10)
The image on the viewfinder screen is not clear.	<ul style="list-style-type: none">• The viewfinder lens is not adjusted. → Adjust the viewfinder lens. (p. 20)
The SteadyShot function does not work.	<ul style="list-style-type: none">• STEADYSHOT is set to OFF in the menu settings. → Set it to ON. (p. 109)
The autofocus function does not work.	<ul style="list-style-type: none">• The camcorder is in manual focus mode. → Turn to auto focus mode. (p. 59)• Shooting conditions are not suitable for autofocus. → Adjust focus manually. (p. 59)
The fader function does not work.	<ul style="list-style-type: none">• The digital effect function is working. → Cancel it. (p. 41)
A vertical band appears when you shoot a subject such as lights or a candle flame against a dark background.	<ul style="list-style-type: none">• The contrast between the subject and background is too high. This is not a malfunction.
Vertical streaks appear when you shoot a very bright subject.	<ul style="list-style-type: none">• This is called the smear phenomenon. This is not a malfunction.

Troubleshooting

Symptom	Cause and/or Corrective Actions
Some tiny white spots appear on the LCD screen or in the viewfinder.	<ul style="list-style-type: none"> When the shutter speed is too low or the low lux mode is selected.
Diagonal stripes appear on the screen.	<ul style="list-style-type: none"> ZEBRA selector is set to 70 or 100. → Set ZEBRA selector to OFF. (p. 48)
Unknown pictures or messages are displayed on the LCD screen or in the viewfinder.	<ul style="list-style-type: none"> If 10 minutes elapse after you set the POWER switch to CAMERA or DEMO MODE is set to ON in the menu settings without a cassette inserted, your camcorder automatically starts the demonstration. → Insert a cassette. The demonstration stops. You can also cancel DEMO MODE. (p. 114)
The click of the shutter does not sound.	<ul style="list-style-type: none"> BEEP is set to OFF in the menu settings. → Set it to MELODY or NORMAL. (p. 109)
The image is not bright even if you use the video flash light.	<ul style="list-style-type: none"> The ND FILTER selector is set to 1 or 2. → Set it to OFF. (p. 47) The manual adjustment is not suitable for the situations. (The  indicator flashes.) → Set the AUTO LOCK selector to AUTO LOCK, or cancel the manual adjustment. (p. 44)

In the playback mode

Symptom	Cause and/or Corrective Actions
The tape does not move when a video control button is pressed.	<ul style="list-style-type: none"> The POWER switch is not set to VCR. → Set it to VCR. (p. 27)
The playback button does not function.	<ul style="list-style-type: none"> The tape has run out. → Rewind the tape. (p. 30)
There are horizontal lines on the picture or the playback picture is not clear or does not appear.	<ul style="list-style-type: none"> The video head may be dirty. → Clean the heads using the Sony DVM12CL cleaning cassette (optional). (p. 159)
No sound or only a low sound is heard when playing back a tape.	<ul style="list-style-type: none"> The volume is turned to minimum. → Turn up the volume. (p. 27) AUDIO MIX is set to the ST2 side in the menu settings. → Adjust AUDIO MIX. (p. 109)
The title search function does not work.	<ul style="list-style-type: none"> The tape has no cassette memory. → Use a tape with cassette memory. (p. 67, 144) CM SEARCH is set to OFF in the menu settings. → Set it to ON. (p. 109) There is no title in the tape. → Superimpose the titles. (p. 99) The tape has a blank portion in the recorded portion. (p. 67)





Troubleshooting

Symptom	Cause and/or Corrective Actions
Displaying the recorded date, date search function does not work.	<ul style="list-style-type: none"> • The tape has no cassette memory. <ul style="list-style-type: none"> → Use a tape with cassette memory. (p. 68, 144) • CM SEARCH is set to OFF in the menu settings. <ul style="list-style-type: none"> → Set it to ON. (p. 109) • The tape has a blank portion in the recorded portion. (p. 69)
The new sound now being added, or that has been added to the recorded tape is not heard.	<ul style="list-style-type: none"> • AUDIO MIX is set to ST1 side in the menu settings. <ul style="list-style-type: none"> → Set it to the side you want to monitor. (p. 109)
The title is not displayed.	<ul style="list-style-type: none"> • TITLE DSPL is set to OFF in the menu settings. <ul style="list-style-type: none"> → Set it to ON. (p. 109)
The sound is muted or images do not appear when monitoring images through TV/VCR.	<ul style="list-style-type: none"> → Pull out the A/V connecting cable from the AUDIO L/R and VIDEO jacks, then connect it again.

In the recording and playback modes

Symptom	Cause and/or Corrective Actions
The power does not turn on.	<ul style="list-style-type: none"> • The battery pack is not installed, or is dead or nearly dead. <ul style="list-style-type: none"> → Install a charged battery pack. (p. 9, 10) • The AC Adaptor is not connected to a wall outlet. <ul style="list-style-type: none"> → Connect the AC Adaptor to a wall outlet. (p. 13)
The end search function does not work.	<ul style="list-style-type: none"> • The tape was ejected after recording when using a tape without cassette memory. (p. 26, 30) • You have not recorded on the new cassette yet. (p. 26, 30)
The end search function does not work correctly.	<ul style="list-style-type: none"> • The tape has a blank portion in the beginning or middle. (p. 26)
The picture does not appear in the viewfinder.	<ul style="list-style-type: none"> • The LCD panel is open. <ul style="list-style-type: none"> → Close the LCD panel. (p. 18)
The battery pack is quickly discharged.	<ul style="list-style-type: none"> • The operating temperature is too low. • The battery pack is not fully charged. <ul style="list-style-type: none"> →
The battery remaining indicator does not indicate the correct time.	

Troubleshooting

Symptom	Cause and/or Corrective Actions
The cassette cannot be removed from the holder.	<ul style="list-style-type: none"> • The power source is disconnected. <ul style="list-style-type: none"> → Connect it firmly. (p. 9, 13) • The battery is dead. <ul style="list-style-type: none"> → Use a charged battery pack. (p. 9, 10)
The  and  indicators flash and no functions except for cassette ejection work.	<ul style="list-style-type: none"> • Moisture condensation has occurred. <ul style="list-style-type: none"> → Remove the cassette and leave your camcorder for at least one hour to acclimatize. (p. 158)
 indicator does not appear when using a tape with cassette memory.	<ul style="list-style-type: none"> • The gold-plated connector of the tape is dirty or dusty. <ul style="list-style-type: none"> → Clean the gold-plated connector. (p. 145)
Remaining tape indicator is not displayed.	<ul style="list-style-type: none"> • The  REMAIN is set to AUTO in the menu settings. <ul style="list-style-type: none"> → Set it to ON to always display the remaining tape indicator. (p. 109)

When operating using the “Memory Stick”

Symptom	Cause and/or Corrective Actions
Operations do not function.	<ul style="list-style-type: none"> • The POWER switch is set to CAMERA or OFF (CHG). <ul style="list-style-type: none"> → Set it to MEMORY or VCR. • The “Memory Stick” is not inserted. <ul style="list-style-type: none"> → Insert a “Memory Stick.” (p. 118)
Recording does not function.	<ul style="list-style-type: none"> • The “Memory Stick” has already been recorded to its full capacity. <ul style="list-style-type: none"> → Erase unnecessary images and record again. (p. 121, 140) • The “Memory Stick” formatted incorrectly is inserted. <ul style="list-style-type: none"> → Format the “Memory Stick” or use another “Memory Stick.” (p. 112) • The write-protect tab on the “Memory Stick” is set to LOCK. <ul style="list-style-type: none"> → Set the tab to write. (p. 116)
The image cannot be deleted.	<ul style="list-style-type: none"> • The image is protected. <ul style="list-style-type: none"> → Cancel image protection. (p. 139) • The write-protect tab on the “Memory Stick” is set to LOCK. <ul style="list-style-type: none"> → Set the tab to write. (p. 116)
You cannot format the “Memory Stick.”	<ul style="list-style-type: none"> • The write-protect tab on the “Memory Stick” is set to LOCK. <ul style="list-style-type: none"> → Set the tab to write. (p. 116)
Deleting all the images cannot be carried out.	<ul style="list-style-type: none"> • The write-protect tab on the “Memory Stick” is set to LOCK. <ul style="list-style-type: none"> → Set the tab to write. (p. 116)
You cannot protect the image.	<ul style="list-style-type: none"> • The write-protect tab on the “Memory Stick” is set to LOCK. <ul style="list-style-type: none"> → Set the tab to write. (p. 116) • The image to be protected is not being played back. <ul style="list-style-type: none"> → Press MEMORY PLAY to play back the image. (p. 133)
You cannot write a print mark on the still image.	<ul style="list-style-type: none"> • The write-protect tab on the “Memory Stick” is set to LOCK. <ul style="list-style-type: none"> → Set the tab to write. (p. 116) • The image that you will write a print mark is not being played back. <ul style="list-style-type: none"> → Press MEMORY PLAY to play back the image. (p. 133)

Troubleshooting

Symptom	Cause and/or Corrective Actions
The photo save function does not work.	<ul style="list-style-type: none">• The write-protect tab on the “Memory Stick” is set to LOCK. → Set the tab to write. (p. 116)• The battery pack is dead. → Install a charged battery pack or use the AC Adaptor instead of the battery pack. (p. 9, 13)

Others

Symptom	Cause and/or Corrective Actions
The title is not recorded.	<ul style="list-style-type: none">• The tape has no cassette memory. → Use a tape with cassette memory. (p. 99, 144)• The cassette memory is full. → Erase unnecessary title. (p. 102)• The tape is set to prevent accidental erasure. → Slide the write-protect tab to REC. (p. 15)• Nothing is recorded in that position on the tape. → Superimpose the title to the recorded position. (p. 99)
The cassette label is not recorded.	<ul style="list-style-type: none">• The tape has no cassette memory. → Use a tape with cassette memory. (p. 105, 144)• The cassette memory is full. → Erase some data. (p. 107)• The tape is set to prevent accidental erasure. → Slide the write-protect tab to REC. (p. 15)
While editing using the i.LINK cable, recording picture cannot be monitored.	<ul style="list-style-type: none">→ Disconnect the i.LINK cable, and connect it again. (p. 75)
Digital program editing does not function.	<ul style="list-style-type: none">• The input selector on the VCR is not set correctly. → Check the connection and set up the selector position. (p. 74)• The camcorder is not connected to Sony DV equipment (When the i.LINK cable is connected). → Set CONTROL to IR in the menu settings and set the recording VCR to be controlled by infrared rays.• Setting program on a blank portion of the tape is attempted. → Set the program again on a recorded portion. (p. 85)• Your camcorder and the VCR are not synchronized. → Synchronize them. (p. 82)

Troubleshooting

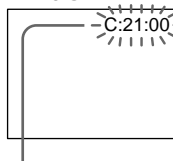
Symptom	Cause and/or Corrective Actions
The Remote Commander supplied with your camcorder does not work.	<ul style="list-style-type: none"> • COMMANDER is set to OFF in the menu settings. → Set it to ON. (p. 109) • Something is blocking the infrared rays. → Remove the obstacle. • The batteries are inserted in the battery holder with the + – polarities incorrectly. → Insert the batteries with the correct polarity. (p. 171) • The batteries are dead. → Insert new ones. (p. 171)
The input picture does not appear on the LCD screen or in the viewfinder when your camcorder is connected to outputs on the TV or VCR.	<ul style="list-style-type: none"> • DISPLAY is set to V-OUT/LCD in the menu settings. → Set it to LCD. (p. 109)
The melody or beep sounds for five seconds.	<ul style="list-style-type: none"> • Moisture condensation has occurred. → Remove the cassette and leave your camcorder for at least one hour to acclimatize. (p. 158) • Some troubles have occurred in your camcorder. → Remove the cassette and insert it again, then operate your camcorder.
When charging the battery pack, no indicator appears or the indicator flashes on the display window.	<ul style="list-style-type: none"> • The AC Adaptor is disconnected. → Connect it properly. • The battery pack malfunctions. → Contact your Sony dealer or local authorized Sony service facility.
You cannot charge the battery pack.	<ul style="list-style-type: none"> • The POWER switch is not set to OFF (CHG). → Set it to OFF (CHG).
The camcorder is immediately turned off even if the amount of the battery remaining time is enough to operate.	<ul style="list-style-type: none"> → Charge the battery pack fully again. The correct remaining time is displayed.
No function works though the power is on.	<ul style="list-style-type: none"> → Disconnect the power cord of the AC Adaptor or remove the battery, then reconnect it after about one minute. Turn the power on. If the functions still do not work, press the RESET button located at the lower-right of the ZEBRA selector using a sharp-pointed object. (If you press the RESET button, all the settings including the date and time return to the default.) (p. 13, 165)

Self-diagnosis display

Your camcorder has a self-diagnosis display function.

This function displays the current condition of your camcorder as a 5-digit code (a combination of a letter and figures) on the LCD screen, display window, or in the viewfinder. If a 5-digit code is displayed, check the following code chart. The last two digits (indicated by □□) will differ depending on the state of your camcorder.

On the LCD screen or in the viewfinder, on the display window



Self-diagnosis display

- C:□□:□□

You can service your camcorder yourself.

- E:□□:□□

Contact your Sony dealer or nearest local authorized Sony service facility.

Five-digit display	Cause and/or Corrective Actions
C:04:□□	<ul style="list-style-type: none"> • You are using a battery pack that is not an "InfoLITHIUM" battery pack. <ul style="list-style-type: none"> → Use an "InfoLITHIUM" battery pack. (p. 10)
C:21:□□	<ul style="list-style-type: none"> • Moisture condensation has occurred. <ul style="list-style-type: none"> → Remove the cassette and leave your camcorder for at least one hour to acclimatize. (p. 158)
C:22:□□	<ul style="list-style-type: none"> • The video heads are dirty. <ul style="list-style-type: none"> → Clean the heads using the Sony DVM12CL cleaning cassette (optional). (p. 159)
C:31:□□	<ul style="list-style-type: none"> • A malfunction other than the above. <ul style="list-style-type: none"> → Remove the cassette and insert it again, then operate your camcorder. → Disconnect the power cord of the AC Adaptor or remove the battery pack. After reconnecting the power source, operate your camcorder.
C:32:□□	
E:61:□□	<ul style="list-style-type: none"> • A malfunction that you cannot service has occurred. <ul style="list-style-type: none"> → Contact your Sony dealer and inform them of the 5-digit code. (example: E:61:10)
E:62:□□	

If you are unable to rectify the problem even if you try corrective actions a few times, contact your Sony dealer or nearest local authorized Sony service facility.

Warning indicators and messages


If indicators and messages appear on the LCD screen or in the viewfinder, check the following:
See the page in parentheses “()” for more information.

Warning indicators

The battery is dead or nearly dead

Slow flashing:

- The battery is nearly dead.

Depending on conditions, the  indicator may flash, even if there are five to 10 minutes remaining. If this flashes, we recommend that you charge the battery or install the charged battery.

Fast flashing:

- The battery is dead (p. 10).
- The battery is completely dead.

Warning indicator as to tape

Slow flashing:

- The tape is near the end.
- No tape is inserted (p. 15).*
- The write-protect tab on the cassette is out (p. 15).*

Fast flashing:

- The tape has run out.*

You need to eject the cassette

Slow flashing:

- The write-protect tab on the cassette is out (p. 15).*

Fast flashing:

- Moisture condensation has occurred (p. 158).*
- The tape has run out.*
- The self-diagnosis display function is activated (p. 154).*

Moisture condensation has occurred*

Fast flashing:

- Eject the cassette, turn off your camcorder, and leave it for about one hour with the cassette compartment open (p. 158).

Warning indicator as to cassette memory

Slow flashing:

- No tape with cassette memory is inserted (p. 144).*

Self-diagnosis display (p. 154)

The still image is protected

Slow flashing:

- The still image is protected (p. 139).*

Warning indicator as to “Memory Stick”*

Slow flashing:

- No “Memory Stick” is inserted (p. 118).

Fast flashing:

- Unreadable “Memory Stick” is inserted.

Warning indicators and messages

100-0001 “(Warning indicators) Memory Stick” file error*

Slow flashing:
















- File is broken.
- File has no compatibility.

“Memory Stick” format error*


Fast flashing:

- There are two directories or more.
- Data is broken.
- “Memory Stick” is not formatted correctly (p. 112).

Warning messages

- **CLOCK SET** Set the date and time (p. 14).
- **FOR “InfoLITHIUM” BATTERY ONLY** Use an “InfoLITHIUM” battery pack (p. 10).
- **MEMORY FULL** The “Memory Stick” is full in photo save function (p. 132).
-  **CLEANING CASSETTE** The video heads are dirty (p. 159).**
-  **FULL** The tape cassette memory is full (p. 101).*
-  **16BIT** AUDIO MODE is set to 16BIT.* You cannot dub new sound (p. 113).
-  **REC MODE** REC MODE is set to LP.* You cannot dub new sound (p. 113).
-  **TAPE** There is no recorded portion on the tape.* You cannot dub new sound (p. 98).
-  **“i.LINK” CABLE** i.LINK cable is connected (p. 98).* You cannot dub new sound.
-  **FULL** The “Memory Stick” is full (p. 123).*
-  **LOCK** The write-protect tab on the “Memory Stick” is set to LOCK (p. 116).*
-  **NO FILE** No still image is recorded on the “Memory Stick”.*
-  **NO MEMORY STICK** No “Memory Stick” is inserted (p. 118).*
-  **MEMORY STICK ERROR** The “Memory Stick” data is corrupted or the “Memory Stick” that you are using is not compatible with your camcorder (p. 118).*
-  **FORMAT ERROR** (p. 112)*
-  **DIRECTORY ERROR** (p. 134)*
- **COPY INHIBIT** The tape contains copyright control signals for copyright protection of software (p. 144).*
-  **TAPE END** The tape has reached the end of the tape (p. 30).*
-  **NO TAPE** Insert a cassette tape (p. 15).*

* You hear the melody or beep sound.

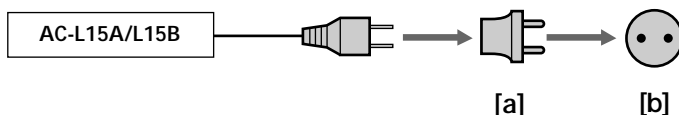
**  and the message appear alternately.

Using your camcorder abroad

Using your camcorder abroad

You can use your camcorder in any country or region with the AC Adaptor supplied with your camcorder within 100 V to 240 V AC, 50/60 Hz.

Use a commercially available AC plug adaptor [a], if necessary, depending on the design of the wall outlet [b].



Your camcorder is an NTSC system based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system based TV with the AUDIO/VIDEO input jack.

The following shows TV color systems used overseas.

NTSC system

Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

PAL system

Australia, Austria, Belgium, China, Czech Republic, Denmark, Finland, Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M system

Brazil

PAL-N system

Argentina, Paraguay, Uruguay

SECAM system



Bulgaria, France, Guyana, Hungary, Iran, Iraq, Monaco, Poland, Russia, Ukraine, etc.

Simple setting of clock by time difference


You can easily set the clock to the local time by setting a time difference. Select WORLD TIME in the menu settings. See page 108 for more information.

Maintenance information and precautions

Moisture condensation

If your camcorder is brought directly from a cold place to a warm place, moisture may condense inside your camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or your camcorder may not operate correctly. If there is moisture inside your camcorder, the beep sounds and the  indicator flashes. When the  indicator flashes at the same time, the cassette is inserted in your camcorder. If moisture condenses on the lens, the indicator will not appear.

If moisture condensation occurred

None of the functions except cassette ejection will work. Eject the cassette, turn off your camcorder, and leave it for about one hour with the cassette compartment open. Your camcorder can be used again if the  indicator does not appear when the power is turned on again.

Note on moisture condensation

Moisture may condense when you bring your camcorder from a cold place into a warm place (or vice versa) or when you use your camcorder in a hot place as follows:

- You bring your camcorder from a ski slope into a place warmed up by a heating device.
- You bring your camcorder from an air-conditioned car or room into a hot place outside.
- You use your camcorder after a squall or a shower.
- You use your camcorder in a high temperature and humidity place.

How to prevent moisture condensation

When you bring your camcorder from a cold place into a warm place, put your camcorder in a plastic bag and tightly seal it. Remove the bag when the air temperature inside the plastic bag has reached the surrounding temperature (after about one hour).

1



M

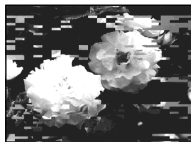
Additional Information

video heads. The video head

"SETTE" message appear one after another

rs, clean the video heads for 10 seconds with the
(optional). Check the picture and if the above
g.

[a]



[b]



or

Cleaning the LCD screen

If fingerprints or dust make the LCD screen dirty, we recommend using a LCD
Cleaning Cloth (optional) to clean the LCD screen.

Maintenance information and precautions

Charging the built-in rechargeable battery

Your camcorder has a built-in rechargeable battery so that the date, time and other settings are retained even when the POWER switch is set to OFF (CHG). The built-in rechargeable battery is always charged as long as you are using your camcorder. The battery, however, will get discharged gradually if you do not use your camcorder. It will be completely discharged in **about four months** if you do not use your camcorder at all. Even if the built-in rechargeable battery is not charged, it will not affect your camcorder operation. To retain the date and time, etc., charge the battery if the battery is discharged.

Charging the built-in rechargeable battery

- Connect your camcorder to the house current using the AC Adaptor supplied with your camcorder, and leave your camcorder with the POWER switch set to OFF (CHG) for more than 24 hours.
- Or install the fully charged rechargeable battery pack on your camcorder, and leave your camcorder with the POWER switch set to OFF (CHG) for more than 24 hours.

Precautions

Camcorder operation

- Operate your camcorder on 7.2 V (battery pack) or 8.4 V (AC Adaptor).
- For DC or AC operation, use the accessories recommended in this operating instructions.
- If any solid object or liquid get inside the casing, unplug your camcorder and have it checked by a Sony dealer before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF (CHG) when you are not using your camcorder.
- Do not wrap your camcorder with a towel, for example, and operate it. Doing so might cause heat to build up inside.
- Keep your camcorder away from strong magnetic fields or mechanical vibration. Noise may appear on the image.
- Do not touch the LCD screen with a sharp-pointed object.
- If your camcorder is used in a cold place, a residual image may appear on the LCD screen. This is not a malfunction.
- While using your camcorder, the back of the LCD screen may heat up. This is not a malfunction.

On handling tapes

- Do not insert anything into the small holes on the rear of the cassette. These holes are used to sense the type and thickness of the tape and if the recording tab is in or out.
- Do not open the tape protect cover or touch the tape.
- Avoid touching or damaging the terminals. To remove dust, clean the terminals with a soft cloth.

Camcorder care

- Remove the tape, and periodically turn on the power, operate the CAMERA and VCR sections and play back a tape for about three minutes when your camcorder is not to be used for a long time.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on the lens, remove them with a soft cloth.
- Clean the camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

- Do not let sand get into your camcorder. When you use your camcorder on a sandy beach or in a dusty place, protect it from the sand or dust. Sand or dust may cause your camcorder to malfunction, and sometimes this malfunction cannot be repaired.

AC Adaptor

- Unplug the unit from the wall outlet when you are not using the unit for a long time. To disconnect the power cord, pull it out by the plug. Never pull the power cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Do not bend the power cord forcibly, or place a heavy object on it. This will damage the cord and may cause fire or electrical shock.
- Prevent metallic objects from coming into contact with the metal parts of the connecting section. If this happens, a short may occur and the unit may be damaged.
- Always keep metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment. AM receivers and video equipment disturb AM reception and video operation.
- The unit becomes warm during use. This is not a malfunction.
- Do not place the unit in locations that are:
 - Extremely hot or cold
 - Dusty or dirty
 - Very humid
 - Vibrating

Rechargeable battery pack

- Use only the specified charger or video equipment with the charging function.
- To prevent accident from a short circuit, do not allow metal objects to come into contact with the battery terminals.
- Keep the rechargeable battery pack away from fire.
- Never expose the rechargeable battery pack to temperatures above 60 °C (140 °F), such as in a car parked in the sun or under direct sunlight.
- Keep the rechargeable battery pack dry.
- Do not expose the rechargeable battery pack to any mechanical shock.
- Do not disassemble nor modify the rechargeable battery pack.
- Attach the rechargeable battery pack to video equipment securely.
- Charging while some capacity remains does not affect the original battery capacity.
- The rechargeable battery pack is not resistant to water. Do not wet the rechargeable battery pack.
- Unless you use the rechargeable battery pack for a long period, store the battery pack after you charge it fully and use it completely once a year.
- Store the rechargeable battery pack in a cool, dry place.

Maintenance information and precautions

Notes on dry batteries

To avoid possible damage from battery leakage or corrosion, observe the following:

- Be sure to insert the batteries with the + – polarities matched to the + – marks.
- Dry batteries are not rechargeable.
- Do not use a combination of new and old batteries.
- Do not use different types of batteries.
- Current flows from batteries when you are not using them for a long time.
- Do not use leaking batteries.

If batteries are leaking

- Wipe off the liquid in the battery compartment carefully before replacing the batteries.
- If you touch the liquid, wash it off with water.
- If the liquid get into your eyes, wash your eyes with a lot of water and then consult a doctor.

If any problem occurs, unplug your camcorder and contact your nearest Sony dealer.

Specifications

Video camera recorder

System

Video recording system

2 rotary heads

Helical scanning system

Audio recording system


Rotary heads, PCM system

Quantization: 12 bits (Fs 32 kHz, stereo 1, stereo 2), 16 bits (Fs 48 kHz, stereo)

Video signal

NTSC color, EIA standards

Usable cassette

Mini DV cassette with the  mark printed

Tape speed

SP: Approx. 18.81 mm/s

LP: Approx. 12.56 mm/s

Recording/playback time (using cassette DVM60)

SP: 1 h

LP: 1.5 h

Fast-forward/rewind time (using cassette DVM60)

Approx. 2 min and 30 s

Viewfinder

Electric viewfinder (color)

Image device

1/3 type CCD (3 Charge Coupled Device)

Approx. 380 000 pixels

(Effective: Approx. 340 000 pixels)

Lens

Combined power zoom lens

Filter diameter 58 mm (2 3/8 in)

12× (Optical), 48× (Digital)

F1.6 - 2.4


Focal length



6 - 72 mm (1/4 - 2 7/8 in)

When converted to a 35 mm still camera

43.2 - 518.4 mm (1 3/4 - 20 1/2 in)

Color temperature

Auto,  Indoor (3 200 K),

 Outdoor (5 800 K),  Flash

Minimum illumination

1 lux (F1.6)

Input/Output connectors

S video input/output

Input/output auto switch

4-pin mini DIN

Luminance signal: 1 Vp-p,

75 ohms, unbalanced

Chrominance signal: 0.286 Vp-p,

75 ohms, unbalanced

Video input/output

Input/output auto switch

RCA pin-jack, 1 Vp-p, 75 ohms, unbalanced

Audio input/output

Input/output auto switch

RCA pin-jack, 327 mV, (at output

impedance more than 47 kilohms)

Output impedance with less than 2.2 kilohms

Input impedance more than 47 kilohms

Headphones jack

Stereo minijack (ø 3.5 mm)

LANC control jack

Stereo mini-minijack (ø 2.5 mm)

MIC jack

Minijack, 0.388 mV low impedance with 2.5 to 3.0 V DC, output impedance 6.8 kilohms (ø 3.5 mm)

Stereo type

DV Interface

4-pin connector

Speaker

Dynamic speaker (ø 20 mm)

LCD screen

Picture

6.2cm (2.5 type)

Total dot number

211 000 (960 × 220)

General

Power requirements

7.2 V (battery pack)

8.4 V (AC Adaptor)

Average power consumption

(when using the battery pack)

During camera recording using

LCD

4.7 W

Viewfinder

4.0 W

Operating temperature

0 °C to 40 °C (32 °F to 104 °F)

Storage temperature

-20 °C to +60 °C (-4 °F to +140 °F)

Dimensions (approx.)

120 × 159 × 393 mm (4 3/4 × 6 3/8 × 15 1/2 in) (w/h/d)

Mass (approx.)

1.5 kg (3 lb 6 oz) including the hood with a lens cap

1.6 kg (3 lb 9 oz)

including the rechargeable battery pack, NP-F330 and cassette DVM60

Supplied accessories

See page 8.

AC Adaptor AC-L15A/L15B

Power requirements

100 - 240 V AC, 50/60 Hz

Current consumption

0.35 - 0.18 A

Power consumption

18 W

Output voltage

DC OUT: 8.4 V, 1.5 A

Operating temperature

0 °C to 40 °C (32 °F to 104 °F)

Storage temperature

-20 °C to +60 °C (-4 °F to +140 °F)

Dimensions (approx.)

56 × 31 × 100 mm

(2 1/4 × 1 1/4 × 4 in) (w/h/d)

excluding projecting parts

Mass (approx.)

190 g (6.7 oz)

excluding power cord

Rechargeable battery pack NP-F330

Output voltage

DC 7.2 V

Capacity

5.0 Wh

Dimensions (approx.)

38.4 × 20.6 × 70.8 mm (1 9/16 ×

13/16 × 2 7/8 in) (w/h/d)

Mass (approx.)

70 g (2.5 oz)

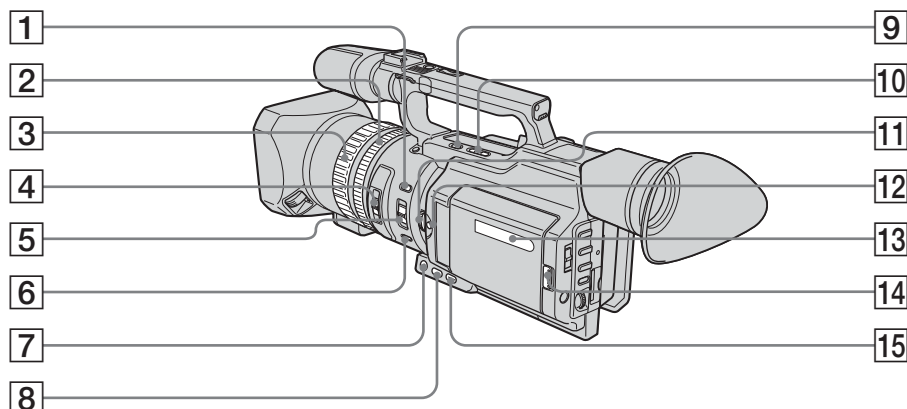
Type

Lithium ion

Design and specifications are subject to change without notice.

Identifying the parts and controls

Camcorder



- | | |
|-------------------------------------|--------------------------------------|
| 1 INDEX MARK button (p. 63) | 8 BACK LIGHT button (p. 23) |
| 2 Zoom ring (p. 21) | 9 END SEARCH button (p. 26) |
| 3 Focus ring (p. 59) | 10 EDITSEARCH buttons (p. 26) |
| 4 ND FILTER selector (p. 47) | 11 EXPOSURE dial (p. 45) |
| 5 FOCUS selector (p. 59) | 12 EXPOSURE button (p. 45) |
| 6 PUSH AUTO button (p. 59) | 13 Display window (p. 171) |
| 7 FADER button (p. 39) | 14 OPEN button (p. 16, 27) |
| | 15 SPOT LIGHT button (p. 24) |

Mini **DV** Digital
Video
Cassette

CM Cassette
Memory

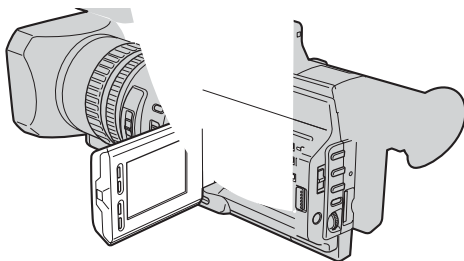
These are trademarks.


i Intelligent
Accessory Shoe

Notes on the intelligent accessory shoe

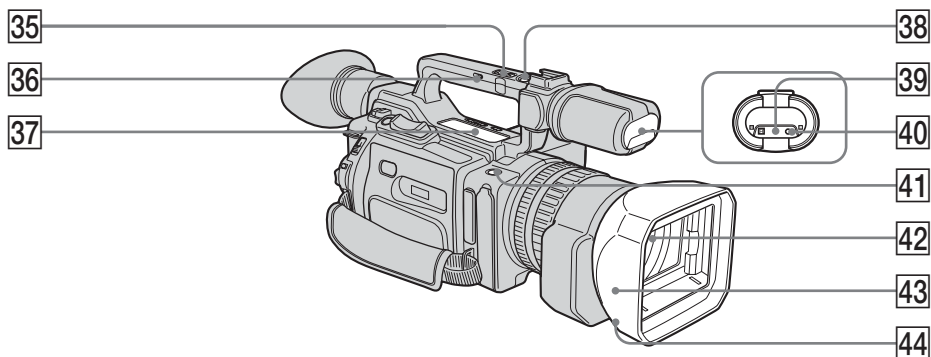
- The intelligent accessory shoe supplies power to optional accessories such as a video light or microphone.
- The intelligent accessory shoe is linked to the POWER switch, allowing you to turn the power supplied by the shoe on and off. Refer to the operating instructions of the accessory for further information.
- The intelligent accessory shoe has a safety device for fixing the installed accessory securely. To connect an accessory, press down and push it to the end, and then tighten the screw.
- To remove an accessory, loosen the screw, and then press down and pull out the accessory.

Identifying the parts and



- | | |
|--|---|
| 16 Speaker | 26 Battery pack (p. 9) |
| 17 LCD screen (p. 18) | 27 ZEBRA selector (p. 48) |
| 18 LCD BRIGHT buttons (p. 19) | 28 RESET button (p. 153) |
| 19 VOLUME buttons (p. 27) | 29 MEMORY INDEX button (p. 134) |
| 20 MEMORY PLAY button (p. 133) | 30 MEMORY DELETE button (p. 140) |
| 21 DISPLAY button (p. 28) | 31 MEMORY + button (p. 126, 133) |
| 22 MEMORY – button (p. 126, 133) | 32 MEMORY MIX button (p. 126) |
| 23 DATA CODE button (p. 28) | 33 PICTURE EFFECT button (p. 40) |
| 24 TITLE button (p. 99) | 34 DIGITAL EFFECT button (p. 42) |
| 25  (self-timer) button (p. 25, 33, 124) | |

Identifying the parts and controls



35 Handle zoom lever (p. 21)

36 Handle zoom switch (p. 21)

37 Video control buttons (p. 27, 30, 85)

II ► SLOW (slow playback)

● AUDIO DUB (dubbing)

■ STOP (stop)

◀◀ REW (rewind)

▶▶ PLAY (playback)

▶▶ FF (Fast-forward)

|| PAUSE (pause)

● REC (recording)

The control buttons light up when you set the POWER switch to VCR.

38 Handle REC START/STOP button (p. 19)

39 Remote sensor/infrared ray emitter

40 Camera recording lamp (p. 16)

41 REC START/STOP button (p. 19)

42 Lens

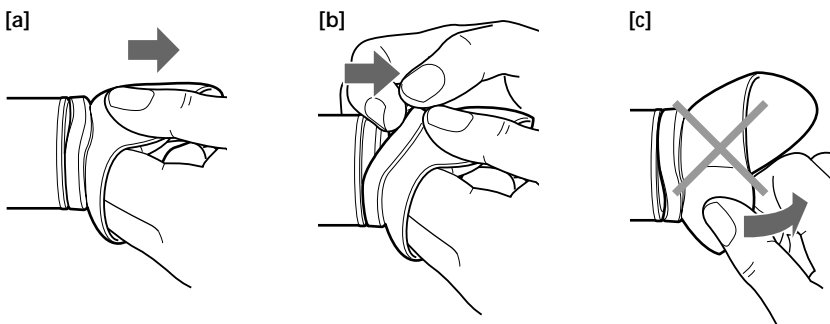
43 Hood with a lens cap (p. 167)

44 Lens hood fixing screw

Identifying the parts and controls

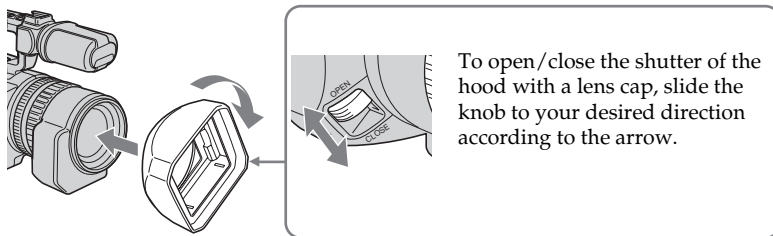
Attaching/removing the eyecup

- When removing the eyecup, pull lightly the upper edge of it with your fingers [a], insert a finger into the gap that appears between the eyecup and viewfinder [b], then remove it.
When attaching the eyecup, fit it onto the camcorder slide it all the way along grooves until it stops.
- Do not pull the eyecup inward or with excessive force [c]. Doing so may damage the eyecup.



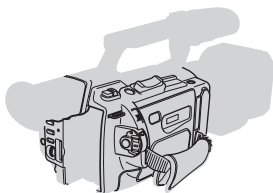
Attaching/removing the hood with a lens cap

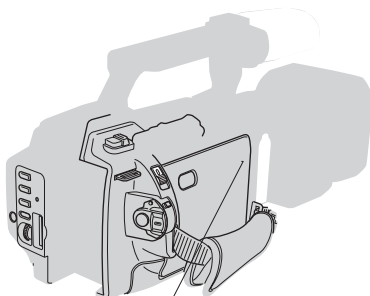
To attach the hood with a lens cap, fit the line on the hood to the corresponding line on the lens frame, then screw the hood clockwise and tighten the hood fixing screw. To remove the hood with a lens cap, loosen the lower hood fixing screw, and unscrew the hood with a lens cap counterclockwise.




When using additional filters






We recommend that you use Sony made filters.





- 64** Carrying handle
- 65** Remote sensor
- 66** Camera recording lamp (p. 16)
- 67** CUSTOM PRESET button (p. 34)
- 68** Viewfinder adjustment lever (p. 20)
- 69** Hook for removing the viewfinder (p. 159)
- 70** EJECT switch (p. 15)
- 71** DC IN jack (p. 10)
- 72** Tripod receptacle
Make sure that the length of the tripod screw is less than 6.5 mm (9/32 inch). Otherwise, you cannot attach the tripod securely and the screw may damage your camcorder.
- 73** Intelligent accessory shoe
- 74** MIC/LINE switch (p. 95)
- 75** MIC jack (PLUG IN POWER) (p. 95)
The MIC jack is used to supply the power to the “plug-in-power” microphone connected, and is used as an audio input jack for an external microphone or audio equipment. When connecting an external microphone, set the MIC/LINE switch to MIC, and when connecting audio equipment, set it to LINE.

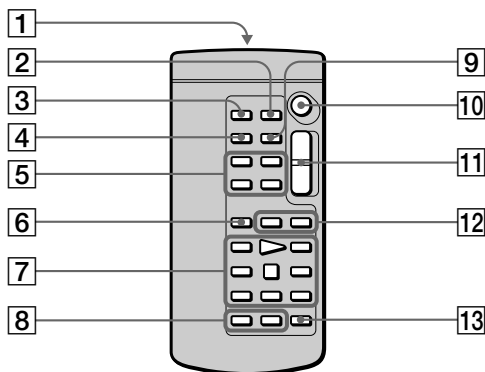
- 76** Microphone (p. 96)
- 77** S VIDEO jack (p. 31, 74, 89, 129)
- 78** VIDEO jack (p. 31, 74, 89, 129)
- 79** AUDIO L/R jack (p. 31, 74, 89, 96)
- 80**  DV Interface (p. 75, 91, 130)
This “i.LINK” mark is a trademark of Sony Corporation and indicates that this product is in agreement with IEEE 1394-1995 specifications and their revisions.

The  DV Interface is i.LINK compatible.
- 81**  LANC jack
 LANC stands for Local Application Control Bus System. The  LANC control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.
- 82**  (headphones) jack
When you use headphones, the speaker on your camcorder is silent.

Identifying the parts and controls

Remote Commander

The buttons that have the same name on the Remote Commander as on your camcorder function identically to the buttons on your camcorder.



1 Transmitter

Point toward the remote sensor to control your camcorder after turning on your camcorder.

2 ZERO SET MEMORY button (p. 64)

3 PHOTO button (p. 32, 121)

4 DISPLAY button (p. 28)

5 Memory control buttons (p. 126, 133)

6 SEARCH MODE button
(p. 65, 67, 68, 70)

7 Video control buttons (p. 30)

8 REC button (p. 89)/**MARK button**
(p. 84)

9 DATA CODE button (p. 28)

10 START/STOP button (p. 16)

11 Power zoom button (p. 21)

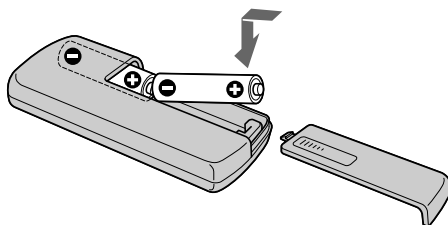
12 I◀◀/▶▶I buttons (p. 65, 67, 68, 70)

13 AUDIO DUB button (p. 97)

Identifying the parts and controls

To prepare the Remote Commander

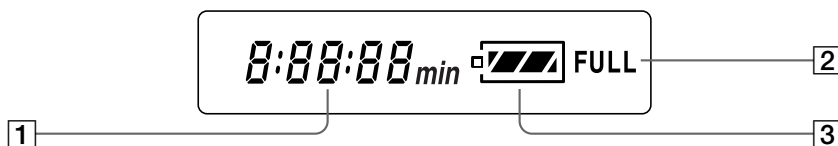
Insert two size AA (R6) batteries by matching the + and – polarities on the batteries to the + – marks inside the battery compartment.



Notes on the Remote Commander

- Point the remote sensor away from strong light sources such as direct sunlight or overhead lighting. Otherwise, the Remote Commander may not function properly.
- Your camcorder works in the commander mode VTR 2. Commander modes 1, 2 and 3 are used to distinguish your camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR in the commander mode VTR 2, we recommend changing the commander mode or covering the sensor of the VCR with black paper.

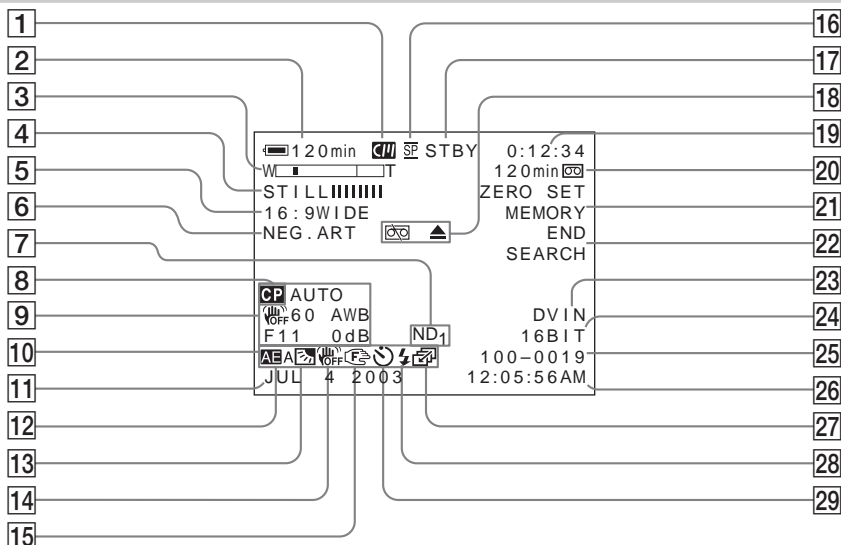
Display window



- 1** Remaining battery time (p. 10)/
Tape counter (p. 64)/
Memory counter (p. 134)/
Time code (p. 22)/
Self-diagnosis (p. 154)
- 2** FULL charge (p. 10)
- 3** Remaining battery (p. 10)

Identifying the parts and controls

Operation indicators



- 1 Cassette memory (p. 144)
- 2 Remaining battery time (p. 22)
- 3 Zoom (p. 21)/Exposure (p. 45)/
Data file name (p. 116)
- 4 Digital effect (p. 41)/FADER (p. 38)/
MEMORY MIX (p. 126)
- 5 16:9WIDE (p. 36)/PROG. SCAN (p. 34)
- 6 Picture effect (p. 40)
- 7 ND filter (p. 27)
- 8 Custom preset (p. 54)
- 9 Data code (p. 29)
- 10 LCD bright (p. 19)/Volume (p. 27)
- 11 Date
- 12 PROGRAM AE (p. 56)
- 13 Backlight (p. 23)/Spot light (p. 24)
- 14 SteadyShot OFF (p. 110)
- 15 Manual focus/Infinity (p. 59)
- 16 Recording mode (p. 113)
- 17 Standby/Recording (p. 16)/
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- 18 Warning (p. 155)
- 19 Tape counter (p. 64)/
Time code (p. 22)/
Self-diagnosis (p. 154)/
Photo mode (p. 32)/
Image number (p. 134)
- 20 Remaining tape (p. 22)/
Memory playback (p. 134)
- 21 ZERO SET MEMORY (p. 64)/
FRAME REC (p. 62)/
Interval recording (p. 60)
- 22 END SEARCH (p. 26)
- 23 DV IN (p. 92)/A/V→DV OUT
- 24 Audio mode (p. 113)
- 25 Data file name
This indicator appears when the
MEMORY MIX functions work.
- 26 Audio input level/Time
- 27 Continuous mode (p. 123)
- 28 Video flash ready
This indicator appears when you use the
video flash light (optional).
- 29 Self-timer (p. 25)

Quick Function Guide

Functions to adjust exposure (in the recording mode)

- In insufficient light Low lux mode (p. 56)
- In dark environments such as sunset, fireworks, or general night views Sunset & moon mode (p. 56)
- Shooting backlit subjects BACK LIGHT (p. 23)
- In spotlight, such as at the theater or a formal event SPOT LIGHT (p. 24)

Functions to give images more impact (in the recording mode)

- Smooth transition between scenes FADER (p. 38)
- Taking a still picture PHOTO (p. 32, 121)
- Digital processing of images PICTURE EFFECT (p. 40)/
DIGITAL EFFECT (p. 41)
- Superimposing a title TITLE (p. 99)

Functions to give a natural appearance to your recordings (in the recording mode)

- Preventing deterioration of picture quality in digital zoom D ZOOM [MENU] (p. 109)
- Focusing manually Manual focus (p. 59)
- Recording fast-moving subjects Sports lesson mode (p. 56)

Functions to be used in editing (in the recording mode)

- Watching the picture on a wide-screen TV Wide mode (p. 36)
- Viewing images using a personal computer "Memory Stick" (p. 116)

Functions to be used after recording (in the playback mode)

- Digital processing of recorded images PICTURE EFFECT (p. 72)/
DIGITAL EFFECT (p. 73)
- Displaying the date/time or various settings when you recorded Data code (p. 29)
- Quickly locating a desired scene Zero set memory (p. 64)
- Searching for scenes having a title Title search (p. 67)
- Searching for scenes recorded in the photo mode Photo search (p. 70)
- Scanning scenes recorded in the photo mode Photo scan (p. 71)
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